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THE

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1932

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1932

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OF THE UNITED KINGDOM

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In compliance with and under the sanction and authority of these Acts of Parliament, the Council reduced to uniformity the several processes and descriptions of the Pharmacopœias of London, Edinburgh, and Dublin, and, published, in 1864 in London, the British Pharmacopœia. A second Pharmacopœia was published in 1867, and an Addendum in 1874. A third Pharmacopœia was prepared in 1885, and a further Addendum in 1890. A fourth Pharmacopœia was issued in 1898, and an Indian and Colonial Addendum in 1900. This Addendum, at the request of the Government of India, was modified to suit Indian requirements, and published as 'The Government of India Edition' in 1901. A fifth Pharmacopœia was issued in 1914.

In 1925 the General Medical Council received a report from its Pharmacopœia Committee stating that they proposed, at an early date, to invite to a conference delegates from a number of Medical, Pharmaceutical, and Scientific Societies likely to be interested, on certain general questions arising out of the proposed revision of the British Pharmacopœia, 1914.

Following upon this conference, in June 1926 the Council received from its Pharmacopœia Committee, and adopted, a recommendation requesting 'the Lord President of the Privy Council to take steps for the appointment of a suitable committee, including Members of the Council, empowered to make enquiries, to collect information, to receive evidence, and to make recommendations on the question whether it is desirable to make any, and if so, what, alterations in the existing law or practice relating to the preparation or publication of the British Pharmacopœia and to its adaptation to the requirements of the British Empire'.

In November of the same year, the Pharmacopœia

Committee reported that the Lord President had acceded to the request of the Council. They stated that the Committee had authorised its Honorary Secretary, Sir Nestor Tirard, and Secretary, Dr P. Hamill, to afford the Lord President's Committee the fullest information regarding its past and present methods, and that they had requested the Registrar to furnish a statement by the Auditors of the income and expenditure connected with the Pharmacopœia.

In May 1928 the Committee of Civil Research, Sub-Committee on the British Pharmacopœia—which had been appointed at the instance of the Lord President, and was constituted as follows: the Right Honourable H. P. Macmillan (now Lord Macmillan), *Chairman*; the Right Honourable Lord Dawson of Penn, G.C.V.O., Sir Donald MacAlister, Bart., K.C.B., Dr H. H. Dale (later Sir Henry Dale), C.B.E., Mr Edmund White, B.Sc. (since deceased), Dr H. G. Dain, with Mr A. F. Hemming, C.B.E., as Secretary, presented their report. This report recommended that the General Medical Council should set up a Selection Committee charged with the duty of selecting persons to form a body to be designated the Pharmacopœia Commission, who should undertake the work of preparing future issues of the British Pharmacopœia, under the general direction of the Council. The recommendations contained in the report were generally approved by the Council, and adopted for their guidance by the Pharmacopœia Committee. The Selection Committee, consisting of the following, was in due course appointed by the General Medical Council: Sir Donald MacAlister, President of the General Medical Council, *Chairman*; Sir Farquhar Buzzard, Sir Humphry Rolleston, and Mr Leathes, representing the General Medical Council; Sir Walter Fletcher, and Dr H. H. Dale, representing the Medical Research

Council; and Mr H. Skinner, Mr E. White, and Mr E. T. Neathercoat, representing the Pharmaceutical Societies of Great Britain, of Ireland and of Northern Ireland.

The Selection Committee resolved that in the first instance the Pharmacopœia Commission should consist of a Chairman and three persons holding medical qualifications, viz.: (*a*) one having a special knowledge of Clinical Medicine, (*b*) one having a special knowledge of Pharmacology and Therapeutics, (*c*) one having a special knowledge of Therapeutic substances, and three persons holding pharmaceutical qualifications, viz.: (*d*) one with a special knowledge of Pharmacognosy, (*e*) one with a special knowledge of General Pharmacy, and (*f*) one with a special knowledge of Pharmaceutical Chemistry and Analysis.

The following names were finally selected: *Chairman*, A. P. Beddard; (*a*) F. R. Fraser, (*b*) J. A. Gunn, (*c*) J. H. Burn, (*d*) H. G. Greenish, (*e*) R. R. Bennett, and (*f*) T. Tickle.

These persons were thereupon appointed by the Council to constitute the Pharmacopœia Commission.

On the recommendation of the Commission, the Council approved the appointment of Mr C. H. Hampshire to be Secretary of the Commission.

The present is the Sixth British Pharmacopœia and has been prepared by the Pharmacopœia Commission, and approved by the Pharmacopœia Committee for submission to the Council.

It has been designed to include only the more important 'standard articles which are in general use throughout the Empire', and the following paragraph from the Report of the Committee of Civil Research Sub-Committee on the British Pharmacopœia (page 54) has been borne in mind:

'Where it is desired that official recognition should be given in any part of the Empire to any local drugs or local substitutes, we suggest that this should be left to the Governments concerned, which, by means of Supplements or Addenda, to which they may accord the necessary sanction, can meet any local requirements or introduce any modifications or alternatives desired.'

The Medical Council has entrusted the general supervision of the work to the Pharmacopœia Committee, whose duty it is ' to deal with all matters relating to the preparation and publication of the *British Pharmacopœia*, and to report thereon from time to time to the Council '. Since 1914, the date of the last issue, the Committee has included the following past members:

Sir Frederick Gowland Hopkins
(The late) Sir Sydney Russell-Wells
Dr Matthew Hay
(The late) Sir Nestor Tirard
Dr Robt. B. Wild
Sir Robert Bolam
Sir Ashley Mackintosh
Dr Alex. Adams
Sir Holburt Waring

The present members of the Pharmacopœia Committee are:

Sir Donald MacAlister, *Chairman*

Mr J. W. Bone
Sir Farquhar Buzzard
Sir Henry Dale
Mr G. H. Edington
Dr Leonard Kidd
Mr J. B. Leathes
Dr E. Magennis
Sir John Moore
Sir Humphry Rolleston

and the President, Sir Norman Walker (*ex officio*) with Dr Philip Hamill, M.A., M.D. Cambridge, D.Sc. London, as *Secretary*.

The Committee has expressed to the Council its high appreciation of the manner in which Dr Hamill has performed his responsible duties since his appointment to the office of Secretary in 1925.

The Committee has further conveyed to the Council a warm expression of its sense of indebtedness to the

INTRODUCTION

In the preparation of this, the sixth British Pharmacopœia, the Commission has consulted, through His Majesty's Privy Council and with the co-operation of the Dominions Office, the India Office, and the Colonial Office, advisory authorities appointed for this purpose in various parts of the Empire, in the effort to produce a Pharmacopœia suitable for the whole British Commonwealth of Nations. It has been thought preferable, however, not to include such substances or preparations as have mainly a local use in particular parts of the Empire, and, therefore, many such substances which were included in the British Pharmacopœia of 1914 have been omitted. It is anticipated that the various authorities concerned in particular parts of the Empire may, under local laws, issue such supplementary lists of substances or preparations as may seem necessary or expedient for local needs.

The intervals elapsing between successive British Pharmacopœias have, in the past, been irregular, varying from three to eighteen years. The Committee of Civil Research, Sub-Committee on the British Pharmacopœia, has recommended that in the future the British Pharmacopœia should be revised every ten years. The advantages of a more regular issue need hardly be emphasised and arrangements have been made for a more continuous and organised consideration of the knowledge available for the preparation of successive Pharmacopœias. Even decennial revisions of the British Pharmacopœia cannot keep it continuously in alignment with the advances in therapeutics and the ancillary sciences. It may be found expedient to issue from time to time a supplement to the Pharmacopœia.

The Pharmacopœia Commission appointed the following Sub-Committees to assist them :—

1. CLINICAL SUB-COMMITTEE.—F. R. Fraser (Chairman). Representatives of :—Apothecaries Hall of Ireland (E. Magennis, T. G. McGrath) ; British Dental Association (F. N. Doubleday, F. Coleman) ; British Medical Association (E. L. Lilley) ; Dental Board (W. Guy, W. F. Bowen) ; Ministry of Health (E. W. Adams, Sir J. Smith-Whitaker) ; Royal College of Physicians of London (Sir L. Rogers, A. M. H. Gray) ; Royal College of Physicians of Edinburgh (R. A. Fleming, J. Orr) ; Royal College of Physicians of Ireland (R. J. Rowlette, L. Abrahamson) ; Royal College of Surgeons of England (W. MacAdam Eccles, V. Bonney) ; Royal College of Surgeons of Edinburgh (D. Lees, J. M. Bowie) ; Royal College of Surgeons in Ireland (L. Abrahamson) ; Royal Faculty of Physicians and Surgeons of Glasgow (R. B. Ness, R. Stockman) ; Royal Society of Medicine (A. W. Bourne, C. F. Hadfield) ; Society of Apothecaries (C. Wall, A. Gibbons), and E. Rock Carling, Sir M. Craig, A. A. Gray, P. H. Manson-Bahr, R. Foster Moore.

2. PHARMACOLOGY SUB-COMMITTEE.—J. A. Gunn (Chairman), A. J. Clark, Sir H. H. Dale, W. J. Dilling, W. E. Dixon (now deceased).

3. BIOLOGICAL STANDARDS SUB-COMMITTEE.—J. H. Burn (Chairman). This Sub-Committee was constituted as a group of subsidiary Committees.

(*a*) *Antitoxins and Sera.*—Sir H. H. Dale, S. R. Douglas, P. Hartley, J. W. Trevan.

(*b*) *Digitalis and Strophanthus.*—Sir H. H. Dale,

H. Deane, N. Evers, J. H. Gaddum, J. W. Trevan, S. W. F. Underhill, F. Wokes.

(*c*) *Ergot.*—W. A. Broom, F. H. Carr, Sir H. H. Dale, H. Deane, N. Evers, J. H. Gaddum, S. Smith, J. W. Trevan, F. Wokes.

(*d*) *Irradiated Ergosterol.*—A. L. Bacharach, R. B. Bourdillon, F. H. Carr, Miss H. Chick, Miss K. H. Coward, N. Evers, Miss E. M. Hume, H. A. D. Jowett, F. L. Pyman, O. Rosenheim.

(*e*) *Ampoule Glass.*—T. T. Cocking, Miss V. Dimbleby, N. Evers, F. H. Lees, W. E. S. Turner, W. H. Withey.

(*f*) *Cod-liver Oil Colour Test.*—A. L. Bacharach, F. H. Carr, T. T. Cocking, N. Evers, H. A. D. Jowett, P. Tainsh, O. Rosenheim.

(*g*) *Arsenobenzene.*—A. J. Ewins, H. A. D. Jowett, H. King, F. L. Pyman.

(*h*) *Sterile Solutions.*—F. H. Carr, C. E. Coulthard, N. Evers, P. Hartley, H. A. D. Jowett, F. L. Pyman.

4. PHARMACOGNOSY SUB-COMMITTEE.—H. G. Greenish (Chairman), H. Deane, J. Small, T. E. Wallis.

5. PHARMACY SUB-COMMITTEE.—R. R. Bennett (Chairman). Representatives of :—Pharmaceutical Society of Great Britain (A. R. Melhuish, E. S. Peck, H. Skinner); North British Branch of the Pharmaceutical Society of Great Britain (J. F. Tocher); Pharmaceutical Society of Ireland (J. Smith); Pharmaceutical Society of Northern Ireland (J. Small), and H. Berry, B. A. Bull, J. H. Franklin, F. W. Gamble, E. W. Lucas, H. B. Mackie, A. L. Taylor.

6. PHARMACEUTICAL CHEMISTRY SUB-COMMITTEE.—T. Tickle (Chairman), G. Barger, C. T. Bennett, E. R. Bolton, F. H. Carr, T. T. Cocking, C. E. Corfield, N. Evers, A. J. Ewins, C. R. Harington, T. A. Henry, H. King,

W. H. Linnell, J. R. Nicholls, A. D. Powell, F. L. Pyman, R. Robinson, P. A. W. Self, W. H. Simmons.

The material submitted by the Sub-Committees was revised by the Commission and prepared for publication by the Editorial Sub-Committee consisting of A. P. Beddard (Chairman), F. R. Fraser, J. A. Gunn.

The British Pharmacopœia is intended to afford to the members of the Medical Profession and to those engaged in the preparation of medicines throughout the British Empire one uniform standard and guide, whereby the nature and composition of substances to be used in medicine may be ascertained and determined.

In selecting the drugs to be included in the Pharmacopœia, the Commission has been guided by a desire to include only those substances which are of sufficient medicinal value to justify the continuance of their use by prescribers. The mere fact that a drug is frequently prescribed has not been considered a sufficient justification for its inclusion and a number of drugs described in the last British Pharmacopœia have been omitted on the ground of insufficient medicinal value.

The last Pharmacopœia contained several instances of groups of drugs which have the same or similar active principles or are employed for the same therapeutic purposes, as for example, the astringents and the purgatives. In preparing this Pharmacopœia the number of such drugs has been reduced by selecting from each group those which appeared to be the most valuable.

The group of Hypodermic Injections of the British Pharmacopœia, 1914, has been omitted. It is considered preferable that the medical practitioner should prescribe the dose of the active material as such, rather than the dose of an official hypodermic injection.

Many of the formulæ for Powders and Pills have been omitted on the ground that the prescribing of combinations of drugs, in these forms, should be left to the individual practitioner. It has been thought advisable, however, to retain the formulæ for a few widely used combinations of drugs.

In conformity with the article of the International Agreement (see page xxv) which requires that ‘ no potent drug shall be prepared in the form of a medicinal wine ’, the Wines of the British Pharmacopœia, 1914, have been omitted.

The Infusions of the last Pharmacopœia, which have been retained, have been renamed Fresh Infusions. Concentrated Infusions have been introduced, which, after dilution, resemble the Fresh Infusions, although it is realised that there are, in some cases, grounds for preferring freshly made infusions. The use of a concentrated infusion of digitalis is not sanctioned.

The aromatic Waters of the last Pharmacopœia, which have been retained, have been renamed Distilled Waters. The permission to prepare certain Waters by solution of a volatile oil has been retained. Concentrated Waters have been introduced, which, after dilution, resemble the aromatic Waters of the last Pharmacopœia.

In conformity with the article of the International Agreement which requires that ‘ simple solutions of chemical substances shall not be named tinctures ’, the Strong Tincture of Iodine and the Weak Tincture of Iodine of the British Pharmacopœia, 1914, have been renamed Strong Solution of Iodine and Weak Solution of Iodine respectively.

Detailed descriptions of the preparation of Suppositories containing a stated dose of a drug have been replaced by a monograph describing a general method of preparation. It is considered desirable that the prescriber should state the dose of a drug which he desires each suppository to contain, rather than that he should prescribe a suppository of standard strength. For the guidance of the pharmacist in dispensing prescriptions in which no dose of the drug is specified, it has been considered advisable to state, for a limited number of drugs, the dose which each suppository shall contain.

Ointments for the Eye have been introduced. Instructions for the preparation of a general basis are given and, in the case of certain drugs, definite proportions are stated for use when the prescriber orders an Ointment for the Eye without specifying the proportion of the drug to be contained in it.

Certain materials which are used mainly for diagnostic purposes have been included, on the ground that standards for them are necessary in order to exclude impurities which might be harmful.

It has long been the practice of the Board of Customs and Excise to allow alcohol, which has been rendered unfit for consumption by means of specified denaturants, to be used in the manufacture of certain pharmaceutical preparations. The conditions under which such denatured alcohol may be used are defined by regulations made under statute by the Board of Customs and Excise. Industrial Methylated Spirit is now described in the Pharmacopœia and its use, under definite conditions, is permitted for the preparation of certain specified liquids intended for external use, for the preparation of certain medicines for internal use, if the material is so treated as to eliminate Methylated Spirit from the final product, and for certain other purposes. The permission to use Industrial Methylated Spirit in the manufacture of Pharmacopœial articles is conditional upon the observance of the law and statutory regulations.

Since the publication of the last Pharmacopœia certain therapeutic agents which can be assayed only by biological methods have become established in medical practice; such are the Antitoxins, Sera, Tuberculin, organic arsenical compounds, Pituitary (posterior lobe) Extract and Insulin. Provision for the control of these drugs has been made, so far as Great Britain and Northern Ireland are concerned, by means of the Therapeutic Substances Act of 1925 and the regulations made thereunder. Some of these preparations are now included in the Pharmacopœia, in order that similar standards may be provided for those parts of the Empire in which otherwise no legal standards would exist.

This Pharmacopœia describes also biological methods of assay for certain well-established drugs, which are not included in the Schedules to the Therapeutic Substances Act, such as Digitalis, Strophanthus, and their preparations, and Strophanthin.

Of the substances which are commonly assayed by biological methods, only those have been included for which a standard of reference has been recommended by the Permanent Commission on Biological Standardisation appointed by the Health Committee of the League of Nations. The standards proposed by the Permanent Commission on Biological Standardisation, or their equivalents, have been accepted and the use of these standards is obligatory in carrying out the biological assays. The principle has been accepted that no biological method of assay is satisfactory which does not depend on a comparison between the sample to be tested and a standard preparation. The work of providing and distributing the standard preparations for use in all these biological assays has been undertaken by the National Institute for Medical Research, Hampstead, London.

The method of comparison is not always prescribed, as the rapid progress of biological science at the present time makes this undesirable. For each substance, however, a method has been indicated which a worker is expected to use unless he employs another method which he can justify as being at least equally good. Since the British Pharmacopœia does not in every case prescribe the details of the method of comparison with standards, the standard materials recommended by the Permanent Commission on Biological Standardisation have not invariably been adopted. Thus while the Permanent Commission recommended ouabain as a standard for strophanthus and its preparations, the standard material adopted in the British Pharmacopœia for Tincture of Strophanthus is not ouabain, but is a Standard Tincture of Strophanthus, the activity of which has been determined in relation to that of the international standard ouabain. The activity of a tincture of strophanthus when stated in terms of ouabain might differ according to the method of comparison, but when stated in terms of the Standard Tincture of Strophanthus, it will be the same whatever method of comparison is used. Similarly, the standard material adopted in the British Pharmacopœia for strophanthin is a Standard Strophanthin-Kombé.

Biological tests for vitamins A and D in Cod-liver Oil are not included in the British Pharmacopœia. While there is much variation in the amounts of these vitamins present in different samples of cod-liver oil, there is no evidence that samples which satisfy the characters and tests for purity demanded do not contain enough for therapeutic purposes. A minimal standard for Cod-liver Oil based upon a colour test is described; it should be noted that the evidence available at present does not justify the conclusion that the intensity of colour produced in this test is a measure of the amount of vitamin A that is present.

A biological assay for Squill has not been included for the following reasons:—different samples of tincture of squill show much more uniformity of activity than do different samples of tincture of digitalis; the biological assay measures the cardiac glucosides present, and these may not be responsible for the expectorant action for which squill is mainly used; no standard for squill is recommended by the Permanent Commission on Biological Standardisation.

In 1930 an International Agreement for the unification of Pharmacopœial formulæ for potent drugs became operative. In ratifying their adhesion to this Agreement the British Government, acting on the recommendation of the General Medical Council, appended a reservation in the following terms:—

'The Government of His Britannic Majesty declares that it reserves the right of introducing into the stipulations of the present Agreement such modifications in detail as established usage in medical and pharmaceutical practice renders expedient, and the progress of medical and pharmaceutical science may from time to time render necessary.'

In preparing this Pharmacopœia the provisions of the Agreement have been carefully studied and, wherever practicable, the requirements of the Pharmacopœia have been made to correspond with them. A table showing the requirements of the Agreement and those of the British Pharmacopœia is included in the Pharmacopœia. It has not been considered advisable as a general principle to adopt the Continental practice of weighing both liquids and solids. With few exceptions liquids are measured by volume and not by weight. This practice is more convenient both to prescribers and to pharmacists. The deviations from the Agreement arising from this difference of usage are of little importance.

The botanical nomenclature has been revised and is in accordance with the International Rules of Botanical Nomenclature as revised at the last International Botanical Congress held at Cambridge in 1930. In describing the parts of plants, the macroscopical and microscopical characters have been detailed; in some instances these characters are the only means of ascertaining their identity and degree of purity. Where trustworthy chemical tests for identity or purity are available, these have been included. Additional standards applicable to crude vegetable drugs have, in many cases, been introduced.

In order to secure greater uniformity in the activity of certain potent vegetable drugs, it has been considered advisable to include powders which have been assayed and adjusted to a standard content of active material.

The chemical tests to be employed in establishing the identity and controlling the purity of Pharmacopœial articles have been considerably extended. The limits of the proportion of lead or of arsenic permissibly present as an impurity in many Pharmacopœial substances, have been revised. Limit tests for chlorides, for sulphates, and for iron in many Pharmacopœial substances have been added. The methods used in determining the chemical standards of fixed oils, fats, waxes, resins and volatile oils have been revised and extended.

The methods of determining the alkaloidal content of vegetable drugs and their preparations have been investigated and extended. In the case of Aconite it has been found that there is not a trustworthy chemical method of assay. Aconite is not considered to be a drug of sufficient medicinal value to warrant the inclusion of a biological method of assay.

The possibility of securing uniformity in the composition of liquid preparations of those vegetable drugs which do not contain alkaloids has been considered. Methods depending on the determination of the proportion of dissolved solids or upon the measurement of physical properties have not been considered to be sufficiently established as criteria to justify their inclusion in the Pharmacopœia. It has been thought advisable, however, to include, for preparations containing alcohol, requirements controlling the amount of alcohol present in the Pharmacopœial preparations.

Numerous papers contributed by members of the Sub-Committees and others to scientific periodicals have been carefully considered and have been of great value in the revision. The following papers describing research work carried out at the request of the Commission have appeared :—

'The Toxicity of Different Commercial Samples of Tetraiodophenolphthalein Sodium' by J. Barba-Gosé.

'The Chemical Assay of Thyroid Gland' by C. R. Harington and S. S. Randall.

'The Stability of Tinctures of Strophanthus and Squill' by G. K. Elphick.

'The Biological Standardisation of Tincture of Aconite' by F. J. Dyer.

'Note on Extract of Colocynth' by E. M. Smelt, Research Assistant to the Pharmacopœia Commission.

'Factors influencing the Stability of Hypochlorite Solutions and a Proposed Formula for a Modified Dakin's Solution' by H. Davis.

'The Toxicity of Different Samples of Mercurochrome' by J. H. Burn and G. K. Elphick.

'The Variations in the Susceptibility of Different Colonies of Mice towards the Toxic Action of Aconite' by W. A. Broom, J. H. Burn, J. H. Gaddum, J. W. Trevan and S. W. F. Underhill.

In the course of the work of revision the Pharmacopœia Commission have issued the following reports, containing the recommendations made to them by the Sub-Committees.

No. 1. Report of Pharmacy Sub-Committee, August 1930.
No. 2. Report of Pharmaceutical Chemistry Sub-Committee, March 1931.
No. 3. Report of Cod-liver Oil Colour Test Sub-Committee, March 1931.
No. 4. Report of Sub-Committee on Digitalis and Strophanthus, May 1931.
No. 5. Report of Sub-Committee on the Preparation of Sterile Solutions for Injection, May 1931.
No. 6. Second Report of Pharmacy Sub-Committee, May 1931.
No. 7. Report of Sub-Committee on Ampoule Glass, June 1931.
No. 8. Report of Sub-Committee on Ergot, October 1931.

The comments and criticisms of medical practitioners, pharmacists and others concerned were invited and the information and suggestions received as a result of the publication of these reports have been fully utilised.

Acting upon the recommendation of the Committee of Civil Research, Sub-Committee on the British Pharmacopœia, the Governments of the Dominions were asked by the General Medical Council to form Committees to deal with Pharmacopœial matters, and as a result Committees in Australia, in Canada, and in India were formed. Important aid has been received from these Committees, not only in deciding upon the drugs and preparations to be described but also in drawing up the descriptions and standards.

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ARTICLES AND PREPARATIONS INCLUDED IN THE BRITISH PHARMACOPŒIA, 1932, WHICH WERE NOT INCLUDED IN THE BRITISH PHARMACOPŒIA, 1914

Acidum Hypophosphorosum Dilutum
Acidum Trichloraceticum
Acriflavina
Æthylenum
Agar
Alcohol
Amidopyrina
Ammonii Bicarbonas
Amylocainæ Hydrochloridum
Antimonii et Sodii Tartras
Antitoxinum Diphthericum
Antitoxinum Tetanicum
Antitoxinum Welchicum
Aqua Anethi Concentrata
Aqua Cinnamomi Concentrata
Aqua Menthæ Piperitæ Concentrata
Aqua Sterilisata
Barbitonum Solubile
Barii Sulphas
Belladonna Pulverata
Benzocaina
Bismuthum Præcipitatum
Caffeina et Sodii Benzoas
Carbonei Dioxidum
Carbonei Tetrachloridum
Carbromalum
Cataplasma Kaolini
Chloramina
Chlorbutol
Cinchophenum
Dextrosum
Digitalis Pulverata
Elixir Cascaræ Sagradæ
Emetinæ Hydrochloridum
Emetinæ et Bismuthi Iodidum
Ephedrinæ Hydrochloridum
Ergota Præparata
Ergotoxinæ Æthanosulphonas
Erythritylis Tetranitras Dilutus
Eucalyptol
Extractum Cinchonæ
Extractum Colchici Liquidum
Extractum Colchici Siccum
Extractum Hepatis Liquidum
Extractum Hepatis Siccum
Extractum Hyoscyami Liquidum
Extractum Malti
Extractum Malti cum Oleo Morrhuæ
Extractum Pituitarii Liquidum
Extractum Senegæ Liquidum
Extractum Sennæ Liquidum
Fluoresceinum Solubile
Gelatinum Zinci
Hydrargyri Oxycyanidum
Ichthammol
Indicarminum
Infusum Aurantii Concentratum
Infusum Buchu Concentratum
Infusum Calumbæ Concentratum
Infusum Caryophylli Concentratum
Infusum Gentianæ Compositum Concentratum
Infusum Quassiæ Concentratum
Infusum Senegæ Concentratum
Infusum Sennæ Concentratum
Injectio Bismuthi
Injectio Bismuthi Salicylatis
Injectio Ferri
Injectio Hydrargyri
Injectio Hydrargyri Subchloridi
Injectio Sodii Chloridi et Acaciæ
Insulinum
Iodophthaleinum
Ipecacuanha Pulverata
Jalapa Pulverata
Lævulosum
Liquor Ammonii Acetatis Fortis
Liquor Ergosterolis Irradiati

Liquor Iodi Simplex
Liquor Sodæ Chlorinatæ Chirurgicalis
Liquor Sodii Chloridi Physiologicus
Methylthioninæ Chloridum
Mistura Magnesii Hydroxidi
Neoarsphenamina
Nitrogenii Monoxidum
Nux Vomica Pulverata
Oculenta
Oleum Chenopodii
Oleum Gossypii Seminis
Oleum Hydnocarpi
Oleum Hydnocarpi Æthylicum
Oleum Santali Australiensis
Opium Pulveratum
Orthocaina
Oxygenium
Pancreatinum
Pasta Zinci Oxidi Composita
Phenobarbitonum
Phenobarbitonum Solubile
Physostigminæ Salicylas
Procainæ Hydrochloridum
Quinidinæ Sulphas
Quininæ Bisulphas
Quininæ et Æthylis Carbonas
Quininæ Tannas
Saccharinum Solubile
Serum Antidysentericum (Shiga)
Sodii Citras
Sodii Hydroxidum
Spiritus Methylatus Industrialis
Strophanthinum
Sulpharsphenamina
Syrupus Ferri Phosphatis Compositus
Theophyllina et Sodii Acetas
Thyroxinsodium
Tinctura Ipecacuanhæ
Tinctura Zingiberis Fortis
Totaquina
Toxinum Diphthericum Calefactum
Toxinum Diphthericum Detoxicatum
Toxinum Diphthericum Diagnosticum
Tuberculinum Pristinum
Unguentum Acidi Tannici
Unguentum Aquosum
Unguentum Simplex
Urea
Vaccinum Typho-paratyphosum (T.A.B.)
Vaccinum Vacciniæ
Zinci Stearas

ARTICLES AND PREPARATIONS INCLUDED IN THE BRITISH PHARMACOPŒIA, 1914, BUT NOT INCLUDED IN THE BRITISH PHARMACOPŒIA, 1932

Acaciæ Cortex
Acetanilidum
Acetum Cantharidini
Acetum Urgineæ
Acidum Hydriodicum Dilutum
Acidum Nitricum Dilutum
Acidum Nitro-Hydrochloricum Dilutum
Acidum Sulphuricum Aromaticum
Acidum Sulphurosum
Aconitina
Æther Aceticus
Agropyrum
Alstonia
Alumen Exsiccatum
Ammoniacum
Ammonii Benzoas
Ammonii Bromidum
Amygdala Amara
Amygdala Dulcis
Anisi Fructus
Anthemidis Flores
Antimonii Oxidum
Antimonium Sulphuratum
Aqua Anisi
Aqua Aurantii Floris
Aqua Carui

Aqua Fœniculi
Aqua Laurocerasi
Aqua Menthæ Viridis
Aqua Rosæ
Araroba
Argenti Nitras Mitigatus
Armoraciæ Radix
Arnicæ Flores
Aurantii Cortex Indicus
Belæ Fructus
Benzaminæ Lactas
Benzenum
Berberis
Betel
Bismuthi Subnitras
Buteæ Gummi
Buteæ Semina
Butyl-Chloral Hydras
Caffeinæ Citras
Caffeinæ Citras Effervescens
Calcii Hypophosphis
Calx
Calx Sulphurata
Cannabis Indica
Carbo Ligni
Carbon Disulphidum
Cascarilla
Cassiæ Fructus
Catechu Nigrum
Cetaceum
Chirata
Chloral Formamidum
Collodium
Collodium Vesicans
Confectio Piperis
Confectio Rosæ Gallicæ
Cubebæ Fructus
Cucurbitæ Semina Præparat
Cusso
Daturæ Folia
Daturæ Semina
Decoctum Acaciæ Corticis
Decoctum Agropyri
Decoctum Aloes Compositum
Decoctum Gossypii Radicis Corticis
Decoctum Hæmatoxyli
Decoctum Ispaghulæ
Decoctum Sappan
Embelia
Emplastrum Calefaciens
Emplastrum Hydrargyri
Emplastrum Menthol
Emplastrum Saponis
Euonymi Cortex
Extractum Agropyri Liquidum
Extractum Aloes
Extractum Belæ Liquidum
Extractum Cannabis Indicæ
Extractum Colchici
Extractum Ergotæ
Extractum Euonymi
Extractum Gossypii Radicis Corticis Liquidum
Extractum Grindeliæ Liquidum
Extractum Hydrastis Liquidum
Extractum Kavæ Liquidum
Extractum Opii Liquidum
Extractum Picrorhizæ Liquidum
Extractum Rhei
Extractum Strophanthi
Extractum Taraxaci
Extractum Viburni Liquidum
Ferri et Potassii Tartras
Ferri Phosphas Saccharatus
Galla
Gelsemii Radix
Glusidum
Glycerinum Pepsini
Glycerinum Plumbi Subacetatis
Glycerinum Tragacanthæ
Gossypii Radicis Cortex
Gossypium
Grindelia
Guaiaci Lignum
Guaiaci Resina
Guaiacol Carbonas
Gummi Indicum
Hæmatoxyli Lignum
Hamamelidis Cortex
Hirudo
Hydrargyri Oxidum Rubrum
Hydrastis Rhizoma
Hyoscyaminæ Sulphas
Infusum Alstoniæ
Infusum Aurantii Compositum

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Infusum Cascarillæ
Infusum Chiratæ
Infusum Cinchonæ Acidum
Infusum Ergotæ
Infusum Krameriæ
Infusum Rhei
Infusum Rosæ Acidum
Infusum Scoparii
Infusum Uvæ Ursi
Injectio Apomorphinæ Hypodermica
Injectio Cocainæ Hypodermica
Injectio Ergotæ Hypodermica
Injectio Morphinæ Hypodermica
Injectio Strychninæ Hypodermica
Ispaghula
Jalapæ Resina
Kaladana
Kaladanæ Resina
Kavæ Rhizoma
Kino
Kino Eucalypti
Laurocerasi Folia
Linimentum Ammoniæ
Linimentum Calcis
Linimentum Chloroformi
Linimentum Crotonis
Linimentum Hydrargyri
Linimentum Opii
Linimentum Potassii Iodidi cum Sapone
Linimentum Sinapis
Liquor Acidi Chromici
Liquor Ammonii Citratis
Liquor Arsenici Hydrochloricus
Liquor Atropinæ Sulphatis
Liquor Bismuthi et Ammonii Citratis
Liquor Calcis Chlorinatæ
Liquor Calcis Saccharatus
Liquor Ethyl Nitritis
Liquor Ferri Perchloridi Fortis
Liquor Ferri Persulphatis
Liquor Formaldehydi Saponatus
Liquor Hamamelidis
Liquor Hydrargyri Nitratis Acidus
Liquor Morphinæ Acetatis
Liquor Morphinæ Tartratis
Liquor Pancreatis
Liquor Potassii Permanganatis
Liquor Sodæ Chlorinatæ
Liquor Sodii Arsenatis
Liquor Zinci Chloridi
Lithii Carbonas
Lithii Citras
Lithii Citras Effervescens
Lotio Hydrargyri Flava
Magnesii Sulphas Effervescens
Mistura Ammoniaci
Mistura Amygdalæ
Mistura Cretæ
Mistura Ferri Composita
Mistura Guaiaci
Mistura Olei Ricini
Morphinæ Acetas
Mucilago Gummi Indici
Myrobalanum
Oleum Ajowan
Oleum Anthemidis
Oleum Chaulmoogræ
Oleum Copaibæ
Oleum Crotonis
Oleum Cubebæ
Oleum Gaultheriæ
Oleum Graminis Citrati
Oleum Juniperi
Oleum Menthæ Viridis
Oleum Phosphoratum
Oleum Rosæ
Oleum Sinapis Volatile
Oliveri Cortex
Oxymel Urgineæ
Phosphorus
Physostigminæ Sulphas
Picrorhiza
Pilula Aloes et Myrrhæ
Pilula Colocynthidis Composita
Pilula Hydrargyri Subchloridi Composita
Pilula Ipecacuanhæ cum Scilla
Pilula Ipecacuanhæ cum Urgineæ
Pilula Phosphori
Pilula Plumbi cum Opio
Pilula Quininæ Sulphatis

Pilula Saponis Composita
Pilula Scillæ Composita
Pilula Urgineæ Composita
Plumbi Iodidum
Potassii Bichromas
Potassii Sulphas
Potassii Tartras
Pterocarpi Lignum
Pulvis Amygdalæ Compositus
Pulvis Antimonialis
Pulvis Buteæ Seminum
Pulvis Catechu Compositus
Pulvis Cinnamomi Compositus
Pulvis Kaladanæ Compositus
Pulvis Kino Compositus
Pulvis Opii Compositus
Pulvis Scammoniæ Compositus
Pyrethri Radix
Rhœados Petala
Rosæ Gallicæ Petala
Salol
Sappan
Scammoniæ Radix
Scoparii Cacumina
Sevum Benzoatum
Sodii Arsenas Anhydrosus
Sodii Citro-Tartras Effervescens
Sodii Hypophosphis
Sodii Sulphis
Spiritus Ammoniæ Fetidus
Spiritus Anisi
Spiritus Armoraciæ Compositus
Spiritus Cinnamomi
Spiritus Juniperi
Spiritus Lavandulæ
Spiritus Myristicæ
Spiritus Rosmarini
Staphisagriæ Semina
Strontii Bromidum
Strychnina
Succus Limonis
Succus Scoparii
Succus Taraxaci
Syrupus Acidi Hydriodici
Syrupus Aromaticus
Syrupus Aurantii Floris
Syrupus Calcii Lactophosphatis
Syrupus Cascaræ Aromaticus
Syrupus Chloral
Syrupus Codeinæ Phosphatis
Syrupus Ferri Phosphatis
Syrupus Rhei
Syrupus Rhœados
Syrupus Rosæ
Syrupus Urgineæ
Taraxaci Radix
Terebinthina Canadensis
Tinctura Aconiti
Tinctura Alstoniæ
Tinctura Arnicæ Florum
Tinctura Berberidis
Tinctura Buchu
Tinctura Cannabis Indicæ
Tinctura Cantharidini
Tinctura Cascarillæ
Tinctura Chiratæ
Tinctura Chloroformi et Morphinæ Composita
Tinctura Cinnamomi
Tinctura Cubebæ
Tinctura Daturæ Seminum
Tinctura Ergotæ Ammoniata
Tinctura Ferri Perchloridi
Tinctura Gelsemii
Tinctura Guaiaci Ammoniata
Tinctura Hamamelidis
Tinctura Hydrastis
Tinctura Jalapæ
Tinctura Jalapæ Composita
Tinctura Kaladanæ
Tinctura Kino
Tinctura Lavandulæ Composita
Tinctura Oliveri Corticis
Tinctura Opii Ammoniata
Tinctura Picrorhizæ
Tinctura Podophylli
Tinctura Podophylli Indici
Tinctura Pruni Virginianæ
Tinctura Pyrethri
Tinctura Quininæ
Tinctura Sennæ Composita
Tinctura Serpentariæ
Tinctura Urgineæ
Tinctura Valerianæ Indicæ Ammoniata
Trochiscus Acidi Benzoici

Trochiscus Catechu
Trochiscus Ferri Redacti
Trochiscus Guaiaci Resinæ
Trochiscus Ipecacuanhæ
Trochiscus Kino Eucalypti
Trochiscus Morphinæ
Trochiscus Potassii Chloratis
Trochiscus Santonini
Trochiscus Sulphuris
Turpethum
Unguentum Aconitinæ
Unguentum Aquæ Rosæ
Unguentum Atropinæ
Unguentum Belladonnæ
Unguentum Cantharidini
Unguentum Cetacei
Unguentum Chaulmoogræ
Unguentum Cocainæ
Unguentum Creosoti
Unguentum Eucalypti
Unguentum Gallæ
Unguentum Gallæ cum Opio
Unguentum Hamamelidis
Unguentum Hydrargyri Iodidi Rubri
Unguentum Hydrargyri Oxidi Flavi
Unguentum Hydrargyri Oxidi Rubri
Unguentum Iodi
Unguentum Iodoformi
Unguentum Lanæ Compositum
Unguentum Myrobalani
Unguentum Myrobalani cum Opio
Unguentum Picis Liquidæ
Unguentum Plumbi Iodidi
Unguentum Plumbi Subacetatis
Unguentum Potassii Iodidi
Unguentum Resinæ
Unguentum Staphisagriæ
Urginea
Uvæ Ursi Folia
Valerianæ Indicæ Rhizoma
Viburnum
Vinum Antimoniale
Vinum Aurantii
Vinum Colchici
Vinum Ferri
Vinum Ferri Citratis
Vinum Ipecacuanhæ
Vinum Quininæ
Vinum Xericum
Zinci Acetas
Zinci Carbonas
Zinci Oleostearas
Zinci Valerianas

ARTICLES AND PREPARATIONS OF THE BRITISH PHARMACOPŒIA, 1932, THE NAMES OF WHICH DIFFER FROM THOSE OF THE CORRESPONDING PREPARATIONS OF THE BRITISH PHARMACOPŒIA, 1914

(Some minor alterations are not included)

Former Names, 1914	Present Names, 1932
Acaciæ Gummi . . .	Acacia
Acidum Arseniosum . .	Arsenii Trioxidum
Acidum Carbolicum . .	Phenol
Acidum Carbolicum Liquefactum	Phenol Liquefactum
Acidum Chromicum . .	Chromii Trioxidum
Acidum Phosphoricum Concentratum	Acidum Phosphoricum
Acidum Picricum . .	Trinitrophenol
Aconiti Radix . . .	Aconitum
Adeps Præparatus . .	Adeps

Former Names, 1914.	Present Names, 1932.
Adrenalinum	Adrenalina
Æther Purificatus	Æther Anæstheticus
Alcohol Absolutum	Alcohol Dehydratum
Alumen Purificatum	Alumen
Anethi Fructus	Anethum
Antimonium Tartaratum	Antimonii et Potassii Tartras
Aqua Anethi	Aqua Anethi Destillata
Aqua Cinnamomi	Aqua Cinnamomi Destillata
Aqua Menthæ Piperitæ	Aqua Menthæ Piperitæ Destillata
Arsenii Iodidum	Arseni Triiodidum
Belladonnæ Folia	Belladonnæ Folium
Borax Purificatus	Borax
Buchu Folia	Buchu
Calcii Carbonas Præcipitatus	Calcii Carbonas
Calcii Hydras	Calcii Hydroxidum
Calumbæ Radix	Calumba
Capsici Fructus	Capsicum
Cardamomi Semina	Cardamomum
Carui Fructus	Carum
Cassiæ Pulpa	Cassia
Cinchonæ Rubræ Cortex	Cinchona
Cinnamomi Cortex	Cinnamomum
Colchici Semina	Colchici Semen
Colocynthidis Pulpa	Colocynthis
Coriandri Fructus	Coriandrum
Creta Præparata	Creta
Digitalis Folia	Digitalis Folium
Emplastrum Resinæ	Emplastrum Colophonii
Ethyl Chloridum	Æthylis Chloridum
Extractum Filicis Liquidum	Extractum Filicis
Extractum Hyoscyami	Extractum Hyoscyami Siccum
Extractum Krameriæ	Extractum Krameriæ Siccum
Fel Bovinum Purificatum	Extractum Fellis Bovini
Fœniculi Fructus	Fœniculum
Gentianæ Radix	Gentiana
Glucosum	Glucosum Liquidum
Glycerinum Acidi Carbolici	Glycerinum Phenolis
Glycyrrhizæ Radix	Glycyrrhiza
Hamamelidis Folia	Hamamelis
Hyoscyami Folia	Hyoscyamus
Infusum Aurantii	Infusum Aurantii Recens
Infusum Buchu	Infusum Buchu Recens
Infusum Calumbæ	Infusum Calumbæ Recens
Infusum Caryophylli	Infusum Caryophylli Recens
Infusum Digitalis	Infusum Digitalis Recens
Infusum Gentianæ Compositum	Infusum Gentianæ Compositum Recens

Former Names, 1914.	Present Names, 1932.
Infusum Quassiæ	Infusum Quassiæ Recens
Infusum Senegæ	Infusum Senegæ Recens
Infusum Sennæ	Infusum Sennæ Recens
Ipecacuanhæ Radix	Ipecacuanha
Ipomœæ Radix	Ipomœa
Krameriæ Radix	Krameria
Lini Semina	Linum
Lini Semina Contusa	Linum Contusum
Liquor Ammoniæ	Liquor Ammoniæ Dilutus
Liquor Ammonii Acetatis	Liquor Ammonii Acetatis Dilutus
Liquor Calcis	Liquor Calcii Hydroxidi
Liquor Potassæ	Liquor Potassii Hydroxidi
Liquor Trinitrini	Liquor Glycerylis Trinitratis
Magnesia Levis	Magnesii Oxidum Leve
Magnesia Ponderosa	Magnesii Oxidum Ponderosum
Naphthol	Betanaphthol
Oleum Carui	Oleum Cari
Oleum Terebinthinæ Rectificatum	Oleum Terebinthinæ
Paraffinum Molle	Paraffinum Molle Album Paraffinum Molle Flavum
Pilula Ferri	Pilula Ferri Carbonatis
Plumbi Oxidum	Plumbi Monoxidum
Podophylli Indici Rhizoma	Podophyllum Indicum
Podophylli Rhizoma	Podophyllum
Potassa Caustica	Potassii Hydroxidum
Pruni Virginianæ Cortex	Prunus Serotina
Pulvis Ipecacuanhæ Compositus	Pulvis Ipecacuanhæ et Opii
Pulvis Sodæ Tartaratæ Effervescens	Pulvis Effervescens Compositus
Quassiæ Lignum	Quassia
Quillaiæ Cortex	Quillaia
Quininæ Hydrochloridum Acidum	Quininæ Dihydrochloridum
Resina	Colophonium
Resorcinum	Resorcinol
Rhei Rhizoma	Rheum
Saccharum Lactis	Lactosum
Saccharum Purificatum	Sucrosum
Senegæ Radix	Senega
Sennæ Folia	Sennæ Folium
Serpentariæ Rhizoma	Serpentaria
Sevum Præparatum	Sevum
Stramonii Folia	Stramonium
Strophanthi Semina	Strophanthus
Styrax Præparatus	Styrax

Former Names, 1914.	Present Names, 1932.
Suppositoria Acidi Carbolici	Suppositorium Phenolis
Suppositoria Plumbi Composita	Suppositorium Plumbi cum Opio
Syrupus Glucosi	Syrupus Glucosi Liquidi
Syrupus Pruni Virginianæ	Syrupus Pruni Serotinæ
Tabellæ Trinitrini	Tabella Glycerylis Trinitratis
Thyroideum Siccum	Thyroideum
Tinctura Camphoræ Composita	Tinctura Opii Camphorata
Tinctura Iodi Fortis	Liquor Iodi Fortis
Tinctura Iodi Mitis	Liquor Iodi Mitis
Tinctura Quininæ Ammoniata	Liquor Quininæ Ammoniata
Tinctura Zingiberis	Tinctura Zingiberis Mitis
Trochiscus Acidi Carbolici	Trochiscus Phenolis
Unguentum Acidi Carbolici	Unguentum Phenolis
Unguentum Hydrargyri Nitratis	Unguentum Hydrargyri Nitratis Forte
Unguentum Zinci	Unguentum Zinci Oxidi
Valerianæ Rhizoma	Valeriana

ARTICLES AND PREPARATIONS OF THE BRITISH PHARMACOPŒIA, 1932, THE COMPOSITION OF WHICH DIFFERS FROM THAT OF THE CORRESPONDING PREPARATION OF THE BRITISH PHARMACOPŒIA, 1914

(Some minor alterations are not included)

Collodium Flexile
Emplastrum Cantharidini
Extractum Colocynthidis Compositum
Extractum Ergotæ Liquidum
Infusum Sennæ Recens
Liquor Adrenalinæ Hydrochloridi
Liquor Arsenicalis
Liquor Cresolis Saponatus
Mistura Sennæ Composita
Pilula Hydrargyri
Pulvis Ipecacuanhæ et Opii
Pulvis Rhei Compositus
Syrupus Ferri Iodidi
Syrupus Ferri Phosphatis cum Quinina et Strychnina
Syrupus Limonis
Syrupus Sennæ
Tinctura Cardamomi Composita
Tinctura Cinchonæ
Tinctura Cinchonæ Composita
Tinctura Colchici
Tinctura Hyoscyami
Tinctura Limonis
Tinctura Quillaiæ
Tinctura Rhei Composita
Trochiscus Krameriæ
Trochiscus Krameriæ et Cocainæ
Trochiscus Morphinæ et Ipecacuanhæ
Trochiscus Phenolis
Unguentum Chrysarobini
Unguentum Hydrargyri Ammoniati
Unguentum Hydrargyri Oleati
Unguentum Hydrargyri Subchloridi
Unguentum Paraffini
Unguentum Phenolis
Unguentum Sulphuris
Unguentum Zinci Oxidi

Articles and Preparations of the British Pharmacopœia, 1932, the Strength of which differs from that of the Corresponding Preparation of the British Pharmacopœia, 1914

(Some minor alterations are not included)

Acetum Scillæ
Acidum Aceticum Dilutum
Acidum Phosphoricum
Extractum Filicis
Infusum Digitalis
Liquor Iodi Mitis
Oxymel Scillæ
Phenol Liquefactum
Pilula Colocynthidis et Hyoscyami
Syrupus Ferri Phosphatis cum Quinina et Strychnina
Syrupus Scillæ
Tinctura Scillæ
Tinctura Stramonii

International Agreement, 1930 Compared with the British Pharmacopœia, 1932

International Agreement	British Pharmacopœia
Aconitum Napellus L.	
Aconiti tuber 'Tubercule', dried.	**Aconitum** Root, dried.
Pulvis Aconiti STRENGTH, 0·5 per cent. of total alkaloids. DILUENT, rice starch.	Not included.
Tinctura Aconiti STANDARD, 0·05 per cent. of total alkaloids. MENSTRUUM, alcohol (70 per cent.).	Not included.
Extractum Aconiti STANDARD, 1 per cent. of total alkaloids.	Not included.
Sirupus Aconiti STANDARD, 0·0025 per cent. of total alkaloids. Prepared from the tincture.	Not included.

International Agreement	British Pharmacopoeia
Atropa Belladonna L.	
Belladonnæ folium Leaf, dried.	**Belladonnæ Folium** Leaves and tops, collected when the plant is in flower, and dried. STANDARD, not less than 0·3 per cent. of alkaloids, calculated as hyoscyamine.
Pulvis Belladonnæ STANDARD (provisional), not less than 0·30 per cent. of total alkaloids. DILUENT, rice starch.	**Belladonna Pulverata** STANDARD, 0·3 per cent. of alkaloids, calculated as hyoscyamine (limits, 0·28 to 0·32).
Tinctura Belladonnæ STANDARD (provisional), not less than 0·03 per cent. of total alkaloids. MENSTRUUM, alcohol (70 per cent.).	**Tinctura Belladonnæ** STANDARD, 0·03 per cent. w/v of alkaloids, calculated as hyoscyamine (limits, 0·028 to 0·032).
Extractum Belladonnæ STANDARD (provisional), not less than 1·3 per cent. of total alkaloids. MENSTRUUM, alcohol (70 per cent.). Evaporation of extracts, below 50°.	**Extractum Belladonnæ Siccum** STANDARD, 1 per cent. of alkaloids, calculated as hyoscyamine (limits, 0·95 to 1·05). MENSTRUUM, Alcohol (70 per cent.). Evaporation of extract, under reduced pressure.
Sirupus Belladonnæ Contains 5 per cent. of Tinctura Belladonnæ.	Not included.
Unguentum Belladonnæ Contains 10 per cent. of Extractum Belladonnæ.	Not included.
Lytta vesicatoria Fabr., *Epicauta Gorhami* Mars, and other blistering insects	
Pulvis Cantharidis STANDARD, not less than 0·60 per cent. of cantharidin.	**Not included.**

International Agreement	British Pharmacopœia
Tinctura Cantharidis STANDARD, 0·06 per cent. of cantharidin. MENSTRUUM, alcohol (70 per cent.).	Not included.
Colchicum autumnale L.	
Colchici semen Seed, dried.	**Colchici Semen** Ripe seeds, dried. STANDARD, not less than 0·3 per cent. of colchicine.
Pulvis Colchici STANDARD, 0·4 per cent. of colchicine. DILUENT, rice starch.	Not included.
Tinctura Colchici STANDARD, 0·04 per cent. of colchicine. MENSTRUUM, alcohol (70 per cent.).	**Tinctura Colchici** STANDARD, 0·03 per cent. of colchicine (limits, 0·027 to 0·033). MENSTRUUM, Alcohol (60 per cent.).
Extractum Colchici STANDARD, 2 per cent. of colchicine.	**Extractum Colchici Siccum** Prepared from the dried corm. STANDARD, 1 per cent. of colchicine (limits, 0·9 to 1·1).
Digitalis purpurea L.	
Digitalis folium Leaf, dried at 55° to 60° C.	**Digitalis Folium** The same.
Pulvis Digitalis	**Digitalis Pulverata** Digitalis Folium, reduced to *No. 20 powder.* Standardised biologically.
Tinctura Digitalis STRENGTH, 10 per cent. by weight. MENSTRUUM, alcohol (70 per cent.).	**Tinctura Digitalis** Prepared either from Digitalis Folium and subsequently standardised biologically, or from Digitalis Pulverata, and contains 1 Unit of activity in 1 millilitre. MENSTRUUM, Alcohol (70 per cent.).

International Agreement	British Pharmacopœia
Sirupus Digitalis	Not included.
Contains 5 per cent. of Tinctura Digitalis.	
Hyoscyamus niger L.	
Hyoscyami folium	**Hyoscyamus**
Leaf, dried.	Leaves, and tops in flower, dried. STANDARD, not less than 0·05 per cent. of alkaloids, calculated as hyoscyamine.
Tinctura Hyoscyami	**Tinctura Hyoscyami**
STRENGTH, 10 per cent. by weight.	STANDARD, 0·005 per cent. of alkaloids, calculated as hyoscyamine (limit, 0·0045 to 0·0055).
MENSTRUUM, alcohol (70 per cent.).	MENSTRUUM, Alcohol (70 per cent.).
Extractum Hyoscyami	**Extractum Hyoscyami Siccum**
	STANDARD, 0·3 per cent. of alkaloids, calculated as hyoscyamine (limits, 0·27 to 0·33).
MENSTRUUM, alcohol (70 per cent.).	MENSTRUUM, Alcohol (70 per cent.).
Evaporation of extracts, below 50° C.	Evaporation of extract, under reduced pressure.
Uragoga Ipecacuanha H.Bn.	
Ipecacuanhæ radix	**Ipecacuanha**
Root, dried.	Root, dried, of *Cephaëlis Ipecacuanha* (Brot.) A. Rich. STANDARD, not less than 2 per cent. of total alkaloids, calculated as emetine, of which not less than two-thirds consists of non-phenolic alkaloids, calculated as emetine.

International Agreement	British Pharmacopoeia
Uragoga Ipecacuanha H.Bn.—*contd.*	
Pulvis Ipecacuanhæ STANDARD, 2 per cent. of total alkaloids.	**Ipecacuanha Pulverata** STANDARD, 2 per cent. of total alkaloids, calculated as emetine (limits, 1·9 to 2·1), of which not less than two-thirds consists of non-phenolic alkaloids, calculated as emetine.
Tinctura Ipecacuanhæ STANDARD, 0·2 per cent. of total alkaloids. MENSTRUUM, alcohol (70 per cent.).	**Tinctura Ipecacuanhæ** STANDARD, 0·1 per cent. of total alkaloids, calculated as emetine (limits, 0·095 to 0·105).
Sirupus Ipecacuanhæ Contains 10 per cent. of Tinctura Ipecacuanhæ	Not included.
Lobelia inflata L.	
Lobeliæ herba Plant, in flower, dried.	**Lobelia** The same.
Tinctura Lobeliæ STRENGTH, 10 per cent. by weight. MENSTRUUM, alcohol (70 per cent.).	**Tinctura Lobeliæ Ætherea** STRENGTH, 20 per cent. w/v. MENSTRUUM, Spirit of Ether.
Strychnos Nux Vomica L.	
Strychni semen Seed, dried.	**Nux Vomica** Ripe seeds, dried. STANDARD, not less than 1·2 per cent. of strychnine.
Pulvis Strychni STANDARD, 2·5 per cent. of total alkaloids.	**Nux Vomica Pulverata** STANDARD, 1·2 per cent. of strychnine (limits, 1·14 to 1·26).

International Agreement	British Pharmacopœia
Strychnos Nux Vomica L.—*contd.*	
Tinctura Strychni	**Tinctura Nucis Vomicæ**
STANDARD, 0·25 per cent. of total alkaloids.	STANDARD, 0·125 per cent. of strychnine (limits, 0·119 to 0·131).
MENSTRUUM, alcohol (70 per cent.).	
Extractum Strychni	**Extractum Nucis Vomicæ Siccum**
STANDARD, 16 per cent. of total alkaloids.	STANDARD, 5 per cent. of strychnine (limits, 4·75 to 5·25).
MENSTRUUM, alcohol (70 per cent.).	MENSTRUUM, Alcohol (70 per cent.).
Defatted.	Defatted.
Opium	**Opium**
Latex of the fruit of *Papaver somniferum* L., dried.	Latex of unripe capsules of *Papaver somniferum* L., dried.
	STANDARD, not less than 9·5 per cent. of morphine, calculated as anhydrous morphine.
Pulvis opii	**Opium Pulveratum**
STANDARD, 10 per cent. of anhydrous morphine.	STANDARD, 10 per cent. of morphine, calculated as anhydrous morphine (limits, 9·5 to 10·5.)
Dried at 60°.	Dried at a moderate temperature.
DILUENT, rice starch or milk sugar.	DILUENT, Lactose.
Pulvis opii et Ipecacuanhæ compositus	**Pulvis Ipecacuanhæ et Opii**
STRENGTH, 10 per cent. of powdered opium and 10 per cent. of powdered ipecacuanha.	STRENGTH, 10 per cent. of Powdered Opium, equivalent to 1 per cent. of anhydrous morphine (limits, 0·95 to 1·05).

International Agreement	British Pharmacopœia
Tinctura opii STANDARD, 1 per cent. of anhydrous morphine. MENSTRUUM, alcohol (70 per cent.).	**Tinctura Opii** STANDARD, 1 per cent. w/v of morphine calculated as anhydrous morphine (limits, 0·95 to 1·05).
Tinctura opii crocata seu Laudanum Sydenhami STANDARD, 1 per cent. of anhydrous morphine.	Not included.
Tinctura opii benzoica STANDARD, 0·05 per cent. of anhydrous morphine.	**Tinctura Opii Camphorata** STANDARD, 0·05 per cent. of morphine calculated as anhydrous morphine (limits, 0·045 to 0·055).
Extractum opii aquosum STANDARD, 20 per cent. of anhydrous morphine.	**Extractum Opii Siccum** STANDARD, 20 per cent. of morphine calculated as anhydrous morphine (limits, 19 to 21).
Sirupus opii STANDARD, 0·05 per cent. of anhydrous morphine.	Not included.
Sirupus opii dilutus seu Sirupus diacodii STANDARD, 0·01 per cent. of anhydrous morphine.	Not included.
Strophanthus gratus Franch. *Strophanthus hispidus* DC. *Strophanthus Kombé* Oliv.	**Strophanthus** Ripe seeds of *Strophanthus Kombé* freed from awns, and dried.
Tinctura Strophanthi STRENGTH, 10 per cent. by weight of defatted seeds of *Strophanthus*	**Tinctura Strophanthi** Prepared from the defatted seeds of *Strophanthus Kombé*.

International Agreement	British Pharmacopœia
hispidus or *Strophanthus Kombé*.	Biologically standardised to possess the same degree of activity as the *standard tincture*.
MENSTRUUM, alcohol (70 per cent.).	MENSTRUUM, Alcohol (70 per cent.).
Tinctura Strophanthi grati A similar tincture prepared from the seeds of *Strophanthus gratus*.	Not included.
Claviceps purpurea Tul.	
Secale cornutum Ergot of rye of the same year, kept entire.	**Ergota** Ergot of rye, dried and kept entire. STANDARD, not less than 0·05 per cent. of total alkaloids.
Extractum secalis cornuti aquosum The aqueous extract re-extracted with alcohol (60 per cent.).	Not included.
Extractum secalis cornuti fluidum STRENGTH, 100 per cent.	**Extractum Ergotæ Liquidum** STANDARD, when freshly prepared, 0·06 per cent. w/v of total alkaloids; after storage, not less than 0·04 per cent. w/v of total alkaloids.
Extractum secalis cornuti fluidum acidum STRENGTH, 100 per cent.	Not included.
Acidum hydrocyanicum dilutum STANDARD, 2 per cent. of hydrocyanic acid.	**Acidum Hydrocyanicum Dilutum** STANDARD, 2 per cent. w/w of HCN (limits, 1·9 to 2·1).
Aqua laurocerasi STANDARD, 0·1 per cent. of hydrocyanic acid.	Not included.

International Agreement	British Pharmacopœia
Aqua amygdalæ amaræ STANDARD, 0·1 per cent. of hydrocyanic acid.	Not included.
Solutio phenoli STANDARD, 2 per cent. of phenol.	Not included.
Natrii arsenas The crystalline salt. STANDARD, 36·85 per cent. of arsenic anhydride (arsenic pentoxide).	Not included.
Solutio arsenicalis seu Fowleri Neutral solution. STANDARD, 1 per cent. of arsenious anhydride (arsenic trioxide).	**Liquor Arsenicalis** The same. STANDARD, 1 per cent. of Arsenic Trioxide (limits, 0·95 to 1·05).
Sirupus ferrosi iodidi concentratus STANDARD, 5 per cent. by weight of ferrous iodide	**Syrupus Ferri Iodidi** STANDARD, 5 per cent. w/w of FeI_2 (limits, 4·75 to 5·25).
Sirupus ferrosi iodidi dilutus STANDARD, 0·5 per cent. by weight of ferrous iodide.	Not included.
Solutio iodi spirituosa Iodine 6·5 grammes, potassium iodide, or sodium iodide, 2·5 grammes, alcohol (90 per cent.) 91 grammes.	Not included.
Cocaini hydrochloridum Anhydrous salt.	**Cocainæ Hydrochloridum** The same.
Unguentum hydrargyri STANDARD, 30 per cent. of mercury.	**Unguentum Hydrargyri** STANDARD, 30 per cent. of Mercury (limits, 29 to 31).
Sirupus morphini STANDARD, 0·5 per cent. of morphine hydrochloride.	Not included.

International Agreement	British Pharmacopœia
Sirupus codeini Standard, 0·20 per cent. of codeine in the form of the base or of a salt.	Not included.
Sirupus chlorali hydrati Standard, 5 per cent. of chloral hydrate.	Not included.
Sirupus hydrargyri iodidi cum Kalii iodido Standard, 0·05 per cent. of mercuric iodide and 2·5 per cent. of potassium iodide.	Not included.
Hydrastis Canadensis L.	
Hydrastidis rhizoma Rhizome and adventitious roots, dried.	Not included.
Pulvis Hydrastidis Standard, not less than 2 per cent. of hydrastine.	Not included.
Tinctura Hydrastidis Standard, 0·2 per cent. of hydrastine. Menstruum, alcohol (60 per cent.).	Not included.
Extractum Hydrastidis fluidum Standard, 2 per cent. of hydrastine.	Not included.
Urginea scilla Steinh.	
Scillæ bulbus Central scales of the white variety, dried.	**Scilla** The same.
Tinctura Scillæ Strength, 10 per cent. Menstruum, alcohol (60 per cent.).	**Tinctura Scillæ** The same.

International Agreement	British Pharmacopœia
Acetum Scillæ STRENGTH, 10 per cent.	**Acetum Scillæ** The same.
Oxymel Scillæ STRENGTH, 50 per cent. of vinegar of squill.	**Oxymel Scillæ** Approximately the same content of squill and of acetic acid, but a larger content of honey.
Cannabis sativa L., var. *indica* Lamk.	
Cannabis indicæ herba Tops in flower and in fruit, of the female plant cultivated in the East Indies, not deprived of resin.	Not included.
Extractum Cannabis indicæ MENSTRUUM, alcohol (90 per cent.).	Not included.
Tinctura Cannabis indicæ STRENGTH, 10 per cent. MENSTRUUM, alcohol (90 per cent.).	Not included.
Solutio nitroglycerini spirituosa STANDARD, 1 per cent. by weight.	**Liquor Glycerylis Trinitratis** STANDARD, 1 per cent. w/v of $C_3H_5(NO_3)_3$ (limits, 0·9 to 1·1).

GENERAL NOTICES

OFFICIAL.

The word 'official' is used in the British Pharmacopœia to signify 'of the Pharmacopœia'. It applies to any title, substance, preparation, method, or statement included in the General Notices, Monographs, and Appendices of the British Pharmacopœia.

OFFICIAL NAMES OF DRUGS, PREPARATIONS AND OTHER SUBSTANCES.

(*a*) *Latin Titles.* The Latin title is given at the beginning of the description of each drug, preparation or substance, e.g. **ACETUM SCILLÆ.**

(*b*) *Abbreviations of Latin Titles.* Below the Latin title an official abbreviation of it is given, e.g. [Acet. Scill.]. For the convenience of the prescriber and the dispenser and the avoidance of misinterpretations, it is desirable that, if an abbreviation of any Latin title is used, it should be the abbreviation of the British Pharmacopœia.

(*c*) *English Titles.* The English title of each substance or preparation is also given, e.g. **Vinegar of Squill.** The English title is an official title and implies that the substance or preparation, so designated, conforms with the requirements of the British Pharmacopœia. The English title is the English name in common use and is not necessarily a literal translation of the Latin title.

(*d*) *Synonyms.* While it is advisable that the Latin or English titles should be employed in prescribing, the more important, or frequently used, alternative names are given as Synonyms. These Synonyms are official titles.

Substances or preparations so designated for use in medicine must conform to the requirements of the British Pharmacopœia. The letters I.A. placed after a Synonym indicate that the Synonym is the title employed in the International Agreement.

INITIAL CAPITAL LETTERS IN THE TEXT.

The names of official drugs, preparations, processes, or substances occurring in the text of the British Pharmacopœia are printed with capital initial letters. For example, in the statement ‘ macerate the Squill with the Dilute Acetic Acid ’, the presence of capital initial letters indicates that the ‘ Squill ’ and ‘ Dilute Acetic Acid ’ to be used are the ‘ Squill ’ and ‘ Dilute Acetic Acid ’ of the British Pharmacopœia.

ITALICS.

Words in the text which refer to substances, reagents, or processes described or defined in an appendix are printed in *italics*, e.g. *solution of phenolphthalein.* When words printed in italics refer to substances, reagents or processes these must conform to the requirements specified in the appropriate appendix. In addition, *italic* type is used for the systematic names of plants, for some sub-headings and for some parts of chemical names.

CHEMICAL FORMULÆ.

When the chemical composition of an official substance is known, the chemical formula and molecular weight are given at the beginning of the monograph for the purposes of information. Graphic structural formulæ are not used, but the conventional symbolic method of indicating the chemical structure of a compound has been employed where this seemed desirable, e.g. Acetonum, $CH_3{\cdot}CO{\cdot}CH_3$. The chemical formulæ and molecular weights given at the beginning of monographs are those of the chemically pure substances and are not to be regarded as an indication of the purity of the official drug. Elsewhere, in statements of standards of purity and strength and in descriptions of processes of assay, it is evident from the context that the formulæ denote the pure chemical substances.

METHODS OF MANUFACTURE.

The instructions given for the manufacture of Pharmacopœial preparations are drawn up so as to provide for the preparation, by the practising pharmacist, of relatively small quantities. If, in manufacturing these preparations on a large scale, deviations are adopted, such deviations must be on points of detail only and the preparations produced must be identical with preparations produced by following precisely the instructions of the Pharmacopœia.

Detailed processes for preparing chemical substances are not given. In many cases more than one method of preparation is in use and new methods are constantly being devised. Whatever method of manufacture is used the resulting substance must conform with the Pharmacopœial requirements. It has been deemed in most cases sufficient, therefore, to refer to one method of production of such a substance and in general terms, the identity of the substance being established by its characters and reactions to specified tests, and its purity assured by means of tests and assay.

CHARACTERS.

In the case of substances of known and defined chemical composition, the statements made under the heading of ‘characters’ are, for the most part, intended to be descriptive of such physical and sensory properties of the substances as may be of importance for the medical practitioner and dispenser. These characters may also render assistance in establishing the identity and state of purity of some of these substances. Their solubilities are, as a rule, included under this heading. The solubilities of some of these substances, however, are of importance as tests for purity and have consequently been included under that heading.

In the case of official plants or parts of plants, on the other hand, the ‘characters’ usually include such physical, sensory and structural properties of the substance as may be the chief, or even the sole, method of establishing its identity.

The characters of galenical preparations are not usually described. They are the less necessary in so far as these preparations are compounded of substances, the characters of which are separately described.

TESTS FOR IDENTITY.

The Tests for Identity are provided only as an aid to identification; they do not in every case suffice to establish proof of identity.

The qualitative tests by which the basic and acidic radicals of ordinary salts are recognised, instead of being many times repeated in the text, are brought together in an appendix.

TESTS FOR PURITY.

The Tests for Purity are not framed to provide against all possible impurities. It is not to be presumed, for example, that an unusual impurity is tolerated which is not precluded by the prescribed tests, should rational considerations require that it be absent.

The Tests for Purity have been framed to summarise the impurities to which attention is more particularly needed; to fix the limits of those which are tolerated to a given extent and to indicate convenient methods of ensuring the absence of certain others for which no tolerance is contemplated.

The impurities which each test is designed to exclude or to limit are indicated as a rule in brackets following the description of the test. In those cases where a small quantity of an impurity is regarded as inevitable and to be tolerated, the test is described as indicating the 'limit' of that impurity. In other cases, where the presence of even small quantities of impurity is not admittedly tolerated the test requires the 'absence' of that impurity.

Following the practice of the last Pharmacopœia the figures relating to limit tests, and to the chemical standards for fixed oils, fats, waxes, resins and volatile oils, are given in the text and a description of the appropriate analytical procedure is given in an Appendix.

DATE OF MANUFACTURE.

The expression 'date of manufacture', occurring in the Pharmacopœia, means either the date of completion of the biological assay, or the date on which the substance was removed from cold storage, after having been kept there at a temperature not exceeding 5° continuously for a period not exceeding two years from the time when the biological assay was completed.

LISTS OF PREPARATIONS.

The lists of preparations included in some of the monographs are not intended to be exhaustive. Preparations are mentioned in relation only to those drugs which form their principal or characteristic ingredients. In the lists the names of some preparations are indented, this indicates that such preparations are not made directly from the drug, but from the preparation of the drug which precedes them.

DOSES.

It must be clearly understood that the 'doses' mentioned in the Pharmacopœia are not authoritatively enjoined, as binding upon prescribers. They are intended merely for general guidance and represent the average range of quantities which are generally regarded as suitable for adults when administered by mouth. The maximal doses mentioned may, as a rule, be repeated three or four times in twenty-four hours, but it must not be assumed that they indicate the greatest amounts of drugs that may be given by repeated administration. The medical practitioner will exercise his own judgement and act on his own responsibility in respect of the amount of any therapeutic agent he may prescribe or administer. When, however, an unusually large dose appears to have been prescribed, it shall be the duty of the pharmacist or dispenser to satisfy himself that the prescriber's intention has been correctly interpreted.

If it is usual to administer a drug by a method other than by mouth, the dose suitable for that method of administration is in most instances mentioned.

It has been thought advisable to state doses for certain drugs which are most commonly given in the form of their preparations, in order to indicate to the prescriber a suitable range of dosage for guidance in circumstances when a preparation of the drug is not available.

Doses are expressed both in the metric system and in the Imperial system, and it is necessary to call attention to the fact that the relation between the metric and the Imperial doses of a given preparation as set forth in the text is of only approximate equivalence. It is inevitable that quantities, which can be expressed in convenient figures in one system, will not yield equally convenient figures in the other system, if expressed in exact equivalents. Moreover the equivalents in one system, for a range of dosage in the other system, cannot be made equally convenient for memorising without either a sacrifice in accuracy or the use of a varying equivalent for any particular quantity. In spite of the fact that this procedure sometimes leads to the use of inconvenient quantities, especially in the metric system, it has been thought preferable to adhere as far as possible to the use of a definite equivalent in the metric system for a definite quantity in the imperial system. The table on page 7 gives the equivalents used for the more common doses. It must be emphasised that these equivalents are merely for the convenience of the prescriber in translating doses from one system to another, and are not sufficiently accurate for pharmaceutical or other purposes.

Following the statements of doses of preparations of the more active drugs, notes have been placed to show the approximate quantities of active ingredients contained in the maximal doses. These are included for the guidance of the prescriber and are not to be regarded as statements of standards

Mils Grammes	**Minims Grains**	**Mils Grammes**	**Minims Grains**
10	150	0·3	5
8	120	0·25	4
6	90	0·2	3
5	75	0·15	$2\frac{1}{2}$
4	60	0·12	2
3	45	0·1	$1\frac{1}{2}$
2·6	40	0·08	$1\frac{1}{3}$
2	30	0·06	1
1·6 or 1·5	25	0·05	$\frac{4}{5}$ or $\frac{3}{4}$
1·2 or 1·3	20	0·04	$\frac{3}{5}$
1	15	0·03	$\frac{1}{2}$
0·8	12	0·025	$\frac{2}{5}$
0·6	10	0·02	$\frac{1}{3}$
0·5	8	0·016	$\frac{1}{4}$
0·4	6	0·012	$\frac{1}{5}$

Gramme	**Grain**	**Gramme**	**Grain**
·01	$\frac{1}{6}$	·001	$\frac{1}{64}$ or $\frac{1}{60}$
·008	$\frac{1}{8}$	·0008	$\frac{1}{80}$
·006	$\frac{1}{10}$	·0006	$\frac{1}{100}$
·005	$\frac{1}{12}$	·0005	$\frac{1}{120}$
·004	$\frac{1}{16}$	·0004	$\frac{1}{160}$
·003	$\frac{1}{20}$	·0003	$\frac{1}{200}$
·0025	$\frac{1}{24}$	·00025	$\frac{1}{240}$
·002	$\frac{1}{30}$	·0002	$\frac{1}{300}$ or $\frac{1}{320}$
·0015	$\frac{1}{40}$	·00015	$\frac{1}{400}$
·0012	$\frac{1}{50}$	·00012	$\frac{1}{500}$

WEIGHTS AND MEASURES.

For all processes, chemical and pharmaceutical, the metric system of weights and measures is employed.

Weights are given in multiples or fractions of a gramme or of a milligram. The terms ‘ centigram ’ and ‘ decigram ’, which were employed in the previous Pharmacopœias, have been discontinued.

Fluid measures are given in multiples or decimals of a millilitre. The Board of Trade (May 1, 1908) recognised ‘ mil ’ as a short official designation for the millilitre, and this convenient term has been used in stating the metric doses. The terms ‘ decimil ’ and ‘ centimil ’, which were employed in the previous Pharmacopœia, have been discontinued.

In paragraphs relating to analysis, and in those relating to the manufacture of galenical preparations, the term 'millilitre' is employed.

The unit of volume denoted by the term 'cubic centimetre' or its abbreviation 'c.c.' differs from a millilitre or mil by so small an amount that the difference may be disregarded for all ordinary purposes. One millilitre is approximately equal to 1·000028 cubic centimetres.

When the term 'drop' is used the measurement is to be made, in accordance with the International Agreement, by means of a tube which delivers in 20 drops 1 gramme of distilled water at 15°.

Metric measures are required by the Pharmacopœia to have been graduated at 15° and all measurements involved in the analytical operations of the Pharmacopœia are intended, unless otherwise stated, to be made at that temperature. For purposes where the Imperial System is employed, measuring vessels are recognised which have been graduated at 16·7° (62° F.), the temperature authorised by the Weights and Measures Act, 1878.

APPROXIMATE (DOMESTIC) MEASURES.

Liquid medicines are often administered in teaspoonful, dessertspoonful or tablespoonful doses, as these quantities are convenient and the requisite measures readily available. As spoons vary greatly in capacity, it is desirable that medicines should be measured in properly graduated measures. It would be preferable if the measure were graduated in mils, or in minims, and fluid ounces, instead of in teaspoonfuls, dessertspoonfuls and tablespoonfuls.

SYMBOLS EMPLOYED IN PRESCRIPTIONS.

In prescriptions the symbol ʒi is often used to represent 60 grains, and also to represent 1 fluid drachm; and the symbol ℥i to represent sometimes 480 grains, sometimes 437·5 grains, and also to represent 1 fluid ounce. As these symbols are apt to be misleading, it is recommended that prescribers should cease to employ them. Instead of them, when the Imperial system is employed, solids should be prescribed in grains (gr.) and ounces (oz. = 437·5 grains), and liquids in minims (m.) and fluid ounces (fl. oz.); and the quantities should be written in Arabic numerals. In order to avoid the possibility of confusion between gramme and grain the symbol G. should be used in prescriptions as the contraction for gramme.

SOLUTION AND SOLUBILITY.

Statements of solubilities refer to solubilities determined at 15·5° unless otherwise stated.

In stating the solubilities of chemical substances the term 'soluble' is necessarily sometimes used in a general sense, irrespective of concomitant chemical change.

PERCENTAGE SOLUTIONS.

In defining standards, the expression 'per cent.' is used according to circumstances with one of three different meanings. In order that the meaning to be attached to the expression in each instance may be clear, the following notation, which has long been in use by pharmacists, has been adopted.

Per cent. w/w, percentage, weight in weight, expresses the number of grammes of active substance in 100 grammes of product.

Per cent. w/v, percentage, weight in volume, expresses the number of grammes of active substance in 100 millilitres of product.

Per cent. v/v, percentage, volume in volume, expresses the number of millilitres of active substance in 100 millilitres of product.

The strengths of solutions of solids in liquids are expressed as percentage weight in volume, of liquids in liquids as percentage volume in volume, and of gases in liquids as percentage weight in weight.

When the strength of a solution is expressed as 'parts' of dissolved substance in parts of the solution it is to be understood to mean parts by weight (grammes) of a solid in parts by volume (millilitres) of the final solution; or parts by volume (millilitres) of a liquid in parts by volume (millilitres) of the final solution; or parts by weight

PRECAUTIONARY LEGAL NOTICE

In some parts of the British Empire the British Pharmacopœia is of statutory force and in some parts of the Empire there are local laws dealing with certain of the substances which are the subject of the monographs which follow. Wherever this latter state of circumstances is believed to exist a caution has been prefixed to the monograph, but it must not be assumed that where no caution appears the subject of the monograph is free from legal restrictions.

Where the preparation or use of any substance is governed by local law the directions of the Pharmacopœia as far as possible are followed as well as those of the local law provided that any direction of the Pharmacopœia which is contradictory or inconsistent with the local law is deemed thereby to be superseded.

It is expedient that local enquiry be made in each case in order to ensure that the provisions of any local law are being complied with.

For Great Britain and Northern Ireland the Therapeutic Substances Act 1925 and the Regulations made thereunder should be consulted.

MONOGRAPHS

ACACIA

[Acac.]

Acacia

Synonyms. Acaciæ Gummi : Gum Acacia.

Acacia is the dried gummy exudation from the stem and branches of *Acacia senegal* Willd. and of some other species of *Acacia.*

Characters. Rounded or ovoid tears of varying size, nearly colourless or pale yellow, opaque from the presence of numerous minute fissures, brittle, or angular fragments with glistening surfaces. Almost odourless; taste, bland and mucilaginous.

Almost entirely soluble in an equal weight of *water,* yielding a translucent, viscous, slightly acid solution which is not glairy, and, when diluted with more *water* and allowed to stand, does not yield a gummy deposit ; insoluble in *alcohol* (*90 per cent.*).

A 10 per cent. w/v aqueous solution is slightly lævorotatory.

Tests for Purity. A 10 per cent. w/v aqueous solution complies with the following tests :—

To 10 millilitres add 0·2 millilitre of *solution of lead acetate* ; no precipitate is produced.

To 10 millilitres, after previous boiling and cooling, add 0·1 millilitre of *N/10 iodine* ; no blue or brown colour is produced (absence of starch and dextrin).

To 10 millilitres add 0·1 millilitre of *solution of ferric chloride* ; no bluish-black colour is produced (absence of tannin).

Loses, when dried at 100°, not more than 15 per cent. of its weight.

Ash, not more than 5 per cent.

Preparations. Injectio Sodii Chloridi et Acaciæ.
Mucilago Acaciæ.
Pulvis Tragacanthæ Compositus.

ACETONUM

[Aceton.]

Acetone

$CH_3 \cdot CO \cdot CH_3$ . . . . Mol. Wt. 58·05

Acetone is dimethyl ketone, and may be obtained by the dry distillation of calcium acetate.

Characters. A clear, colourless, mobile and volatile liquid ; taste pungent and sweetish ; odour, characteristic. Inflammable.

Miscible with *water*, with *alcohol* (*90 per cent.*), with *ether* and with *chloroform*.

Test for Identity. To 1 millilitre of a 0·5 per cent. v/v solution in *water* add 1 millilitre of *solution of sodium nitroprusside* and 2 millilitres of *N/1 sodium hydroxide*, and then a slight excess of *acetic acid* ; a deep red colour is produced, which changes to violet on dilution with *water*.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·796 to 0·801 ; *boiling-point*, not less than 95 per cent. v/v distils between 56° and 58°.

10 millilitres, diluted with 10 millilitres of *water*, is not alkaline to *litmus* (limit of alkalinity).

10 millilitres, diluted with 10 millilitres of *water*, does not require for neutralisation more than 0·2 millilitre of *N/10 sodium hydroxide*, *solution of phenolphthalein* being used as indicator (limit of acidity).

To 20 millilitres add 0·1 millilitre of *N/10 potassium permanganate*, and allow to stand for fifteen minutes ; the solution is not completely decolourised (limit of methyl alcohol and other readily oxidisable substances).

Shake 10 millilitres with 40 millilitres of *carbon disulphide* ; a clear solution is produced.

Leaves, on evaporation, not more than 0·01 per cent. w/v of residue.

ACETUM SCILLÆ

[Acet. Scill.]

Vinegar of Squill

Vinegar of Squill contains active constituents approximately equivalent to 10 per cent. w/v of Squill.

Squill, bruised	100 grammes
Dilute Acetic Acid . . .	1000 millilitres

Macerate the Squill with the Dilute Acetic Acid for seven days, with occasional agitation. Drain off the liquid; press the marc; mix the two liquids; heat to boiling, and filter while hot. Set aside for not less than seven days; filter.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·031 to 1·035.

10 millilitres, diluted with 10 millilitres of *water*, requires for neutralisation not less than 9·0 millilitres, and not more than 10·5 millilitres, of *N/1 sodium hydroxide*, *solution of phenolphthalein* being used as indicator (limits of acidity).

Preparation. Syrupus Scillæ.

DOSES

Metric.	**Imperial.**
0·6 to 2 mils.	**10 to 30 minims.**

ACIDUM ACETICUM

[Acid. Acet.]

Acetic Acid

Acetic Acid may be obtained by the destructive distillation of wood, or by dilution of Glacial Acetic Acid. It contains 33 per cent. w/w of $C_2H_4O_2$ (limits, 32·5 to 33·5).

Characters. A clear, colourless liquid; odour, pungent; taste, sharply acid.

Miscible with *water*, with *alcohol* (*90 per cent.*), and with *glycerin*.

Tests for Identity. Acid in reaction, and, when neutralised, yields the *reactions* characteristic of acetates.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·044 to 1·045.

To 5 millilitres add 20 millilitres of *water* and 0·5 millilitre of *N/10 potassium permanganate*; the pink colour does not entirely disappear within half a minute (limit of readily oxidisable impurities).

Mix 5 millilitres with 2·5 millilitres of *N/10 potassium dichromate* and 6 millilitres of *sulphuric acid*, and allow to stand for one minute; add 20 millilitres of *water*, cool to 15°, and add 1 millilitre of *solution of potassium iodide*; a yellow or brown colour is produced immediately (limit of formic acid, and of oxidisable impurities).

1 millilitre complies with the *limit test for chlorides*, and with the *limit test for sulphates*.

Arsenic limit, 2 parts per million. *Lead limit*, 1 part per million.

Leaves, on evaporation to dryness, not more than 0·01 per cent. w/w of residue.

Assay. Weigh accurately about 5 grammes into a stoppered flask containing 50 millilitres of *water*, and titrate with *N/1 sodium hydroxide*, using *solution of phenolphthalein* as indicator. Each millilitre of *N/1 sodium hydroxide* is equivalent to 0·06003 gramme of $C_2H_4O_2$.

Preparation. Acidum Aceticum Dilutum

ACIDUM ACETICUM DILUTUM

[Acid. Acet. Dil.]

Dilute Acetic Acid

Dilute Acetic Acid contains 6 per cent. w/w of $C_2H_4O_2$ (limits 5·7 to 6·3).

Acetic Acid	182 grammes
Distilled Water . . .	818 grammes

Mix.

Tests for Purity. *Specific gravity* (15·5°/15·5°), about 1·008.

To 25 millilitres add 0·5 millilitre of *N/10 potassium permanganate*; the pink colour does not entirely disappear within half a minute (limit of readily oxidisable impurities).

Mix 5 millilitres with 0·5 millilitre of *N/10 potassium dichromate* and 6 millilitres of *sulphuric acid*, and allow to stand for one minute; add 20 millilitres of *water*, cool to 15°, and add 1 millilitre of *solution of potassium iodide*; a yellow or brown colour is produced immediately (limit of formic acid, and of oxidisable impurities).

Lead limit, 0·5 part per million.

Complies with the other Tests for Purity described under 'Acidum Aceticum' when five times the stated quantity is taken for each test.

Assay. Carry out the Assay as described under 'Acidum Aceticum', using about 20 grammes, accurately weighed.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

ACIDUM ACETICUM GLACIALE

[Acid. Acet. Glac.]

Glacial Acetic Acid

$CH_3{\cdot}COOH$ . . . . Mol. Wt. 60·03

Glacial Acetic Acid may be obtained by the action of sulphuric acid on an acetate, or by synthesis. It contains not less than 99 per cent. w/w of $C_2H_4O_2$.

Characters. A clear, colourless liquid ; odour, pungent. Crystallises when cooled to about 10°, and does not completely re-melt until warmed to about 15°.

Miscible with *water*, and with most fixed and volatile oils.

Tests for Identity. Acid in reaction and, when diluted with *water* and neutralised, yields the *reactions* characteristic of acetates.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·055 to 1·058 ; *freezing-point*, not lower than 14·8°.

Arsenic limit, 6 parts per million. *Lead limit*, 3 parts per million.

When diluted with twice its volume of *water*, complies with the other Tests for Purity described under ' Acidum Aceticum '.

Leaves, on evaporation to dryness, not more than 0·01 per cent. w/w of residue.

Assay. Carry out the Assay as described under ' Acidum Aceticum ', using about 2 grammes, accurately weighed.

ACIDUM ACETYLSALICYLICUM

[Acid. Acetylsalicyl.]

Acetylsalicylic Acid

Synonym. Aspirin.

NOTE.—The use of the name Aspirin as a synonym for Acetylsalicylic Acid is limited to Great Britain and Northern Ireland. In parts of the British Empire, in which the word Aspirin is a trade-mark, it may be used only when applied to the product made by the owners of the trade-mark.

$CH_3{\cdot}CO_2{\cdot}C_6H_4{\cdot}COOH$ $[CH_3{\cdot}CO_2 : COOH = 1 : 2]$
Mol. Wt. 180·1

Acetylsalicylic Acid may be obtained by the action of acetic anhydride, or of acetyl chloride, on salicylic acid. It contains not less than 99·5 per cent. of $C_9H_8O_4$.

Characters. Small, colourless, acicular crystals, or a white crystalline powder. Odourless; taste, slightly acid. Stable in dry air, but in contact with moisture gradually hydrolyses into acetic and salicylic acids.

Soluble in about 300 parts of *water*, in 5 parts of *alcohol (90 per cent.)*, in about 20 parts of *ether*, in 17 parts of *chloroform*, and in strong solutions of *ammonium acetate*.

Soluble, with decomposition, in solutions of alkalis, and of alkali carbonates.

Tests for Identity. An aqueous solution is acid to *litmus*.

Boil 0·5 gramme for two or three minutes with 10 millilitres of *solution of sodium hydroxide*, cool, and add an excess of *dilute sulphuric acid*; a crystalline precipitate is produced, and the odour of acetic acid is perceptible. To an aqueous solution of the precipitate add *test-solution of ferric chloride*; a deep violet colour is produced.

Boil 0·1 gramme with 10 millilitres of *water*, and add 1 drop of *test-solution of ferric chloride*; a violet-red colour is produced.

Tests for Purity. *Melting-point*, 135° to 138°.

Dissolve 0·5 gramme in 10 millilitres of cold *sulphuric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

Dissolve 0·6 gramme in 9 millilitres of *alcohol (90 per cent.)*, and dilute to 90 millilitres with *water*. Transfer 60 millilitres to a Nessler tube. To the remaining 30 millilitres add 3 millilitres of *alcohol (90 per cent.)* and 1 millilitre of a 0·01 per cent. w/v freshly prepared aqueous solution of *salicylic acid*, dilute to 60 millilitres with *water*, and transfer to a second Nessler tube. Add to the contents of each tube 1 millilitre of a freshly prepared 0·2 per cent. w/v aqueous solution of *ferric ammonium sulphate*, and compare the colours immediately; the violet colour in the first tube is not deeper than that in the second (limit of salicylic acid).

Arsenic limit, 2 parts per million. *Lead limit*, 10 parts per million.

Leaves, on incineration, not more than 0·05 per cent. of residue.

Assay. To about 1·5 grammes, accurately weighed, add 50 millilitres of *N/2 sodium hydroxide*, and boil gently for ten minutes. Titrate the excess of alkali with *N/2 sulphuric acid*, using *solution of phenolphthalein* as indicator. Repeat the operation without the acetylsalicylic acid. The difference between the titrations represents the amount of alkali required by the acetylsalicylic acid. Each millilitre of *N/2 sodium hydroxide* is equivalent to 0·04502 gramme of $C_9H_8O_4$.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	5 to 15 grains.

ACIDUM BENZOICUM

[Acid. Benz.]

Benzoic Acid

$C_6H_5 \cdot COOH$ . . . . Mol. Wt. 122·0

Benzoic Acid may be obtained from benzoin, or by synthesis. It contains not less than 99·5 per cent. of $C_7H_6O_2$.

Characters. Colourless, light feathery crystals; almost odourless. Melts and sublimes on heating.

Soluble in 450 parts of *water*, and in 3 parts of *alcohol (90 per cent.)*; readily soluble in *ether*, and in *chloroform*.

Tests for Identity. An aqueous solution is acid to *litmus*.

The solution, obtained by gently warming 0·2 gramme with 20 millilitres of *water* and 1 millilitre of *N/1 sodium hydroxide* and filtering, yields a buff-coloured precipitate with *test-solution of ferric chloride*.

Tests for Purity. *Melting-point*, 121° to 122°.

Mix 0·5 gramme with 2 grammes of *anhydrous sodium carbonate* in a small crucible; invert in a larger crucible, and add 3 grammes of *anhydrous sodium carbonate* to cover the junction of the two crucibles; heat strongly and rapidly over a Bunsen flame, and continue to heat for ten minutes, cool, dissolve the residue in 45 millilitres of *water* and 7 millilitres of *nitric acid*, and filter; to the filtrate add 1 millilitre of *solution of silver nitrate*; no more opalescence is produced than that given by adding 1 millilitre of *solution of silver nitrate* to 50 millilitres of a solution, containing 5 grammes of *anhydrous sodium carbonate*, 7 millilitres of *nitric acid* and 1 millilitre of *N/100 hydrochloric acid* (limit of chlorinated compounds).

Warm 0·1 gramme with 0·1 gramme of *potassium permanganate* and 5 millilitres of *dilute sulphuric acid*; no odour of benzaldehyde is developed (limit of cinnamic acid).

Warm 0·1 gramme to 50° with 2 millilitres of *sulphuric acid*; not more than a pale brown colour is produced.

Arsenic limit, 2 parts per million. *Lead limit*, 5 parts per million.

Leaves, on incineration, not more than 0·05 per cent. of residue.

Assay. Dissolve about 2·5 grammes, accurately weighed, in 15 millilitres of warm *alcohol (90 per cent.)*, previously neutralised to *phenol red*, add 20 millilitres of *water*, and titrate with *N/2 sodium hydroxide*, using *solution of phenol red* as indicator. Each millilitre of *N/2 sodium hydroxide* is equivalent to 0·06102 gramme of $C_7H_6O_2$.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	**5 to 15 grains.**

ACIDUM BORICUM

[Acid. Boric.]

Boric Acid

Synonym. Boracic Acid.

H_3BO_3 . . . . Mol. Wt. 61·84

Boric Acid may be obtained by the interaction of sulphuric acid and native borates. It contains not less than 99·5 per cent. of H_3BO_3.

Characters. White crystals, or powder; taste, slightly acid and bitter, with a sweetish after-taste; odourless; touch, unctuous. Heated at 100°, it loses water and is partially transformed into metaboric acid, HBO_2.

Soluble in 25 parts of *water*, in 30 parts of *alcohol* (*90 per cent.*), and in 4 parts of *glycerin.*

Tests for Identity. *Turmeric paper*, moistened with a dilute aqueous solution to which a small quantity of *hydrochloric acid* has been added, becomes pink or brownish-red on drying, and the colour changes to blue or greenish-black on the addition of *dilute solution of ammonia*, or of *solution of sodium hydroxide.*

An alcoholic solution, when ignited, burns with a flame tinged with green.

Tests for Purity. 1 gramme dissolves in 10 millilitres of boiling *alcohol* (*90 per cent.*).

2·5 grammes, boiled with 25 millilitres of *water* and 1 millilitre of *hydrochloric acid*, gives a solution which, when cooled and filtered, complies with the *limit test for sulphates.*

Arsenic limit, 5 parts per million. *Lead limit*, 25 parts per million.

Assay. Dissolve about 2 grammes, accurately weighed, in a mixture of 50 millilitres of *water* and 50 millilitres of *glycerin*, and titrate with *N/1 sodium hydroxide*, using *solution of phenol violet* as indicator. Each millilitre of *N/1 sodium hydroxide* is equivalent to 0·06184 gramme of H_3BO_3.

Preparations. Glycerinum Acidi Borici
Unguentum Acidi Borici

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	5 to 15 grains.

ACIDUM CITRICUM

[Acid. Cit.]

Citric Acid

$COOH{\cdot}C(OH)(CH_2{\cdot}COOH)_2,H_2O$ Mol. Wt. 210·1

Citric acid may be obtained from lemon juice, or may be prepared from glucose. It contains not less than 99·5 per cent., and not more than the equivalent of 101 per cent., of $C_6H_8O_7,H_2O$.

Characters. Large, colourless crystals, or a white powder; slightly hygroscopic in moist air, and slightly efflorescent in warm dry air; odourless; taste, strongly acid.

Soluble in less than 1 part of *water*, and in about 1·5 parts of *alcohol* (*90 per cent.*); slightly soluble in *ether*.

Tests for Identity. Yields, when neutralised, the *reactions* characteristic of citrates.

Tests for Purity. Heat 1 gramme in powder in a boiling water-bath with 10 millilitres of *sulphuric acid* for one hour; not more than a faint yellow colour is produced (absence of tartaric acid, and of readily carbonisable substances).

Dissolve 2 grammes in 20 millilitres of *water*, add 4 millilitres of *dilute solution of ammonia* and 1 millilitre of *solution of calcium chloride*, and allow to stand for twenty-four hours; the solution remains clear (limit of oxalic acid).

Dissolve 2 grammes in 40 millilitres of *water*, and add 10 millilitres of *dilute solution of ammonia* and 5 drops of *solution of sodium sulphide PbT*; the colour produced is at most only slightly deeper than that produced in a similar mixture, containing in addition 1 millilitre of *solution of potassium cyanide PbT* (limit of copper and iron).

2·5 grammes complies with the *limit test for sulphates.*

Arsenic limit, 1 part per million. *Lead limit,* 20 parts per million.

Leaves, on incineration, not more than 0·05 per cent. of residue.

Assay. Dissolve about 3 grammes, accurately weighed, in 100 millilitres of *water*, and titrate with *N/1 sodium hydroxide*, using *solution of thymol blue* as indicator. Each millilitre of *N/1 sodium hydroxide* is equivalent to 0·07003 gramme of $C_6H_8O_7,H_2O$.

DOSES

Metric.	Imperial.
0·3 to 2 grammes.	**5 to 30 grains.**

ACIDUM HYDROBROMICUM DILUTUM

[Acid. Hydrobrom. Dil.]

Dilute Hydrobromic Acid

HBr . . . . . Mol. Wt. 80·92

Dilute Hydrobromic Acid may be obtained by the interaction of bromine and sulphurous acid. It contains 10 per cent. w/w of HBr (limits, 9·8 to 10·2).

Characters. A clear, colourless liquid; odourless.

Tests for Identity. Strongly acid in reaction.

Yields, when neutralised, the *reactions* characteristic of bromides.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·072 to 1·075.

To 10 millilitres add 1 millilitre of *dilute sulphuric acid*, dilute with 50 millilitres of *water*, and allow to stand for thirty minutes; no turbidity is produced (limit of barium).

Dilute 1 millilitre with 10 millilitres of *water*, and add 0·5 millilitre of *N/100 iodine*; the colour of the iodine is not completely discharged (limit of sulphite).

Expel the bromine from 5 millilitres by boiling for one minute with a mixture of 25 millilitres of *nitric acid* and 70 millilitres of *water*, a rapid current of air being passed through the mixture while boiling and for twenty minutes during cooling; the residual liquid requires for complete precipitation not more than 1·5 millilitres of *N/10 silver nitrate* (limit of chloride).

5 millilitres complies with the *limit test for sulphates*.

Arsenic limit, 5 parts per million. *Lead limit*, 5 parts per million.

Leaves, when evaporated on a water-bath, not more than 0·01 per cent. w/w of residue.

Assay. Mix about 10 grammes, accurately weighed, with about 30 millilitres of *water*, and titrate with *N/2 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/2 sodium hydroxide* is equivalent to 0·04046 gramme of HBr.

DOSES

Metric.	**Imperial.**
1 to 4 mils.	**15 to 60 minims.**

ACIDUM HYDROCHLORICUM

[Acid. Hydrochlor.]

Hydrochloric Acid

HCl . . . . . . Mol. Wt. 36·46

Hydrochloric Acid is an aqueous solution, obtained by dissolving hydrogen chloride in water. It contains 32 per cent. w/w of HCl (limits, 31 to 33).

Characters. A colourless, fuming liquid; odour, pungent.

When distilled, it yields a constant-boiling mixture, containing approximately 20 per cent. w/w of hydrogen chloride and boiling at about 110°.

Tests for Identity. Strongly acid, even when diluted freely.

Yields, when neutralised, the *reactions* characteristic of chlorides.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·158 to 1·168.

Dilute 5 millilitres with 10 millilitres of freshly boiled and cooled *water*, add 1 millilitre of *solution of cadmium iodide*, and shake with 1 millilitre of *chloroform*; the chloroform layer does not become violet within one minute (limit of free chlorine).

Dilute 5 millilitres with 10 millilitres of *water*, add 1 millilitre of *chloroform*, and, drop by drop with constant shaking, *solution of chlorinated lime*; the chloroform layer does not become brown or violet (limit of bromide, and of iodide).

Dilute 1 millilitre with 10 millilitres of *water*, and add 0·5 millilitre of *N/100 iodine*; the colour of the iodine is not completely discharged (limit of sulphite).

Evaporate 5 millilitres to dryness on a water-bath; the residue, dissolved in *water*, complies with the *limit test for sulphates*.

Arsenic limit, 5 parts per million. *Lead limit*, 10 parts per million.

Leaves, on evaporation and gentle ignition, not more than 0·01 per cent. w/w of residue.

Assay. Weigh accurately about 4 grammes into a stoppered flask, containing 40 millilitres of *water*, and titrate with *N/1 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/1 sodium hydroxide* is equivalent to 0·03646 gramme of HCl.

Preparation. Acidum Hydrochloricum Dilutum.

ACIDUM HYDROCHLORICUM DILUTUM

[Acid. Hydrochlor. Dil.]

Dilute Hydrochloric Acid

Dilute Hydrochloric Acid contains 10 per cent. w/w of HCl (limits, 9·5 to 10·5).

Hydrochloric Acid . . .	313 grammes
Distilled Water . . .	687 grammes

Mix.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·045 to 1·052. Complies with the Tests for Purity described under 'Acidum Hydrochloricum', when three times the quantity is taken for each test.

Assay. Carry out the Assay described under 'Acidum Hydrochloricum', using about 10 grammes, accurately weighed.

DOSES

Metric.	Imperial.
0·3 to 4 mils.	5 to 60 minims.

ACIDUM HYDROCYANICUM DILUTUM

[Acid. Hydrocyan. Dil.]

Dilute Hydrocyanic Acid

Dilute Hydrocyanic Acid is an aqueous solution of hydrogen cyanide, which may be obtained by the interaction of dilute sulphuric acid and potassium ferrocyanide. It contains 2 per cent. w/w of HCN (limits, 1·9 to 2·1).

Characters. A colourless liquid; odour, characteristic.
Specific gravity (15·5°/15·5°), about 0·997.
Slightly acid to *litmus*.

Tests for Identity. Yields, when neutralised, the *reactions* characteristic of cyanides.

Tests for Purity. 2 grammes complies with the *limit test for sulphates*.

Leaves, on evaporation, not more than 0·02 per cent. of residue.

Assay. Weigh accurately about 5 grammes into a flask, containing 5 millilitres of *dilute solution of ammonia* and 20 millilitres of *water*, add 5 drops of *solution of potassium iodide* and 30 millilitres of *water*, and titrate with *N/10 silver nitrate*.

Each millilitre of *N/10 silver nitrate* is equivalent to 0·0054 gramme of HCN.

Storage. Dilute Hydrocyanic Acid should be kept in a small glass-stoppered bottle, inverted, protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
0·12 to 0·3 mil.	2 to 5 minims.

ACIDUM HYPOPHOSPHOROSUM DILUTUM

[Acid. Hypophosph. Dil.]

Dilute Hypophosphorous Acid

Dilute Hypophosphorous Acid may be prepared by interaction of barium hypophosphite and dilute sulphuric acid. It contains 10 per cent. w/w of H_3PO_2 (limits, 9·8 to 10·2).

Characters. A clear, colourless liquid ; odourless ; taste, strongly acid.

Miscible with *water*, and with *alcohol* (*90 per cent.*).

Tests for Identity. Strongly acid, even when freely diluted with water.

1 millilitre, added to 10 millilitres of *test-solution of mercuric chloride*, produces a white precipitate which changes to grey on heating, and finally deposits a globule of metallic mercury.

1 millilitre, warmed with 5 millilitres of *solution of copper sulphate*, produces a reddish-brown precipitate.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·040 to 1·042.

Dilute 1 gramme with 10 millilitres of *water*, add 1 millilitre of *dilute sulphuric acid*, and allow to stand for one hour ; no turbidity, or precipitate, is produced (limit of barium).

Dilute 1 gramme with 10 millilitres of *water*, and add 1 millilitre of *solution of calcium chloride* and 2 millilitres of *dilute solution of ammonia* ; not more than a slight turbidity is produced (limit of phosphoric and oxalic acids).

Heat 1 gramme with 1 millilitre of *nitric acid* in a water-bath, until the reaction ceases ; the residue complies with the *limit test for chlorides*.

1 gramme complies with the *limit test for sulphates*.

0·2 gramme complies with the *limit test for iron*.

Arsenic limit, 2 parts per million. *Lead limit*, 5 parts per million.

Assay. Dilute about 10 grammes, accurately weighed, with 50 millilitres of *water*, and titrate with *N/2 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/2 sodium hydroxide* is equivalent to 0·03302 gramme of H_3PO_2.

DOSES

Metric.	Imperial.
0·3 to 1 mil.	5 to 15 minims.

ACIDUM LACTICUM

[Acid. Lact.]

Lactic Acid

$CH_3 \cdot CHOH \cdot COOH$ . . Mol. Wt. 90·05

Lactic Acid may be obtained by the lactic fermentation of sugar. It consists of a mixture of lactic acid and lactide, and contains the equivalent of not less than 87·5 per cent. w/w of $C_3H_6O_3$.

Characters. A colourless, syrupy, hygroscopic liquid; odourless or with a slight, but not unpleasant, odour; taste, sour.

Miscible in all proportions with *water*, with *alcohol* (*90 per cent.*), and with *ether*.

Tests for Identity. Reaction strongly acid.

1 gramme, warmed with 0·1 gramme of *potassium permanganate*, yields the odour of acetaldehyde.

Tests for Purity. *Specific gravity* (15·5°/15·5°), about 1·21.

Dilute 1 gramme with 10 millilitres of *water*, neutralise with *solution of sodium hydroxide*, add 5 millilitres of *solution of potassio-cupric tartrate*, and boil; not more than the slightest trace of a red precipitate is produced (limit of various sugars).

1 gramme complies with the *limit test for chlorides*, with the *limit test for sulphates*, and with the *limit test for iron*.

Arsenic limit, 5 parts per million. *Lead limit*, 10 parts per million.

Leaves, on incineration, not more than 0·1 per cent. w/w of residue.

Assay. Dilute about 3 grammes, accurately weighed, with 50 millilitres of *water*, add 50 millilitres of *N/1 sodium hydroxide*, and boil gently for five minutes; titrate the excess of alkali with *N/1 sulphuric acid*, using *solution of phenolphthalein* as indicator. Repeat the operation without the Lactic Acid. The difference between the two titrations represents the alkali required to convert the lactic acid and the lactide into sodium lactate. Each millilitre of *N/1 sodium hydroxide* is equivalent to 0·09005 gramme of $C_3H_6O_3$.

DOSES

Metric.	Imperial.
0·3 to 1·2 mils.	5 to 20 minims.

ACIDUM NITRICUM

[Acid. Nit.]

Nitric Acid

HNO_3 . . . . . . Mol. Wt. 63·02

Nitric Acid may be obtained by the interaction of sulphuric acid and sodium nitrate. It contains 70 per cent. w/w of HNO_3 (limits, 69 to 71).

Characters. A clear, colourless or almost colourless, liquid. Emits corrosive fumes.

Tests for Identity. Strongly acid, even when diluted freely. Yields, when neutralised, the *reactions* characteristic of nitrates.

Tests for Purity. *Specific gravity* (15·5°/15·5°), about 1·42.

Dilute 1 millilitre with 20 millilitres of *water*, and add a slight excess of *dilute solution of ammonia*; a blue colour is not produced; to this mixture add *hydrogen sulphide*; a precipitate is not produced (limit of copper, and of zinc).

5 millilitres, neutralised with *dilute solution of ammonia*, complies with the *limit test for chlorides*.

5 millilitres, evaporated on a water-bath and the residue diluted to 50 millilitres with *water*, complies with the *limit test for sulphates*.

0·5 millilitre complies with the *limit test for iron*.

Arsenic limit, 5 parts per million. *Lead limit*, 20 parts per million.

Leaves, on evaporation and gentle ignition, not more than 0·01 per cent. w/w of residue.

Assay. Weigh accurately about 4 grammes into a stoppered flask, containing 40 millilitres of *water*, and titrate with *N/1 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/1 sodium hydroxide* is equivalent to 0·06302 gramme of HNO_3.

ACIDUM OLEICUM

[Acid. Oleic.]

Oleic Acid

Oleic Acid may be obtained by hydrolysis of fats, or of fixed oils, and separation of the liquid acids by expression. It consists chiefly of $C_{17}H_{33}\cdot COOH$.

Characters. A colourless or yellowish, oily liquid; odour and taste, characteristic; on exposure to air it darkens in colour, and the odour and taste become more pronounced.

Insoluble in *water* ; readily soluble in *alcohol* (*90 per cent.*), in *ether*, in *chloroform*, in *benzene*, and in *light petroleum* (*boiling-point, 50° to 60°*).

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), about 0·898 ; *acid value*, 195 to 200 ; *iodine value*, 85 to 90.

When cooled, it does not become cloudy until the temperature has fallen to 10° (limit of stearic acid) ; when cooled to about 4°, it congeals to a whitish solid, or semi-solid, mass.

Shake 5 millilitres with an equal volume of *water*, allow the liquids to separate, and filter through paper moistened with *water* ; the filtrate is not acid to *methyl orange* (limit of mineral acids).

Boil in a large flask 1 millilitre with 5 millilitres of *N/1 sodium carbonate* and 25 millilitres of *water* ; the solution, while hot, is clear or at most opalescent (limit of neutral fats and mineral oils).

Leaves, on incineration, not more than 0·1 per cent. w/w of residue.

DOSES

Metric.	Imperial.
0·3 to 1 mil.	5 to 15 minims.

ACIDUM PHOSPHORICUM

[Acid. Phosph.]

Phosphoric Acid

Synonyms. Acidum Phosphoricum Concentratum : Concentrated Phosphoric Acid.

H_3PO_4 . . . . . . Mol. Wt. 98·04

Phosphoric Acid may be obtained by the oxidation of phosphorus in contact with water. It contains 89 per cent. w/w of H_3PO_4 (limits, 88 to 90).

Characters. A colourless liquid of syrupy consistence ; odourless.

Miscible with water. When heated, it loses water and is converted finally into metaphosphoric acid, which, on cooling, forms a transparent mass.

Tests for Identity. Strongly acid, even when diluted freely.

Yields, when neutralised, the *reactions* characteristic of phosphates.

Tests for Purity. *Specific gravity* (15·5°/15·5°), about 1·75.

1 millilitre, diluted with *water*, gives no precipitate when made alkaline with *dilute solution of ammonia* (limit of calcium, and of aluminium).

0·5 millilitre, diluted with 10 millilitres of *water*, does not become brown on warming with 2 millilitres of *solution of silver nitrate* (limit of phosphorous and hypophosphorous acids).

1 millilitre complies with the *limit test for chlorides.*

0·5 millilitre complies with the *limit test for sulphates.*

0·1 millilitre complies with the *limit test for iron.*

Arsenic limit, 5 parts per million. *Lead limit,* 10 parts per million.

Assay. Mix about 2 grammes, accurately weighed, with a solution of 10 grammes of *sodium chloride* in 30 millilitres of *water,* and titrate with *N/1 sodium hydroxide,* using *solution of phenolphthalein* as indicator. Each millilitre of *N/1 sodium hydroxide* is equivalent to 0·04902 gramme of H_3PO_4.

Preparation. Acidum Phosphoricum Dilutum.

ACIDUM PHOSPHORICUM DILUTUM

[Acid. Phosph. Dil.]

Dilute Phosphoric Acid

Dilute Phosphoric Acid contains 10 per cent. w/w of H_3PO_4 (limits, 9·5 to 10·5).

Phosphoric Acid . . .	112 grammes
Distilled Water . . .	888 grammes

Mix.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·054 to 1·060.

Complies with the Tests for Purity described under 'Acidum Phosphoricum', when eight times the quantity is taken for each test.

Assay. Carry out the Assay as described under 'Acidum Phosphoricum', using about 10 grammes, accurately weighed.

DOSES

Metric.	**Imperial.**
0·3 to 4 mils.	**5 to 60 minims.**

ACIDUM SALICYLICUM

[Acid. Salicyl.]

Salicylic Acid

$HO{\cdot}C_6H_4{\cdot}COOH$ [HO : COOH = 1 : 2] Mol. Wt. 138.0

Salicylic Acid may be prepared by the interaction of sodium phenate and carbon dioxide. It contains not less than 99·5 per cent. of $C_7H_6O_3$.

Characters. Colourless crystals, or a light feathery crystalline powder; almost odourless; taste, sweetish and acrid.

Soluble in about 500 parts of *water*, and in 3·5 parts of *alcohol (90 per cent.)*; readily soluble in *ether*, and in *chloroform*; soluble in solutions of *ammonium acetate*, of *sodium phosphate* of *potassium citrate*, and of *sodium citrate*.

Tests for Identity. An aqueous solution is acid to *litmus*.

An aqueous solution gives with *test-solution of ferric chloride* a deep violet colour.

Tests for Purity. *Melting-point*, 158° to 159°.

Shake 0·5 gramme with 10 millilitres of *water*, and filter; the filtrate, evaporated to dryness, leaves a white residue having no buff-coloured fringe (absence of iron, and of colouring matter).

Arsenic limit, 2 parts per million. *Lead limit*, 5 parts per million.

Leaves, on incineration, not more than 0·05 per cent. of residue.

Assay. Dissolve about 3 grammes, accurately weighed, in 15 millilitres of warm *alcohol (90 per cent.)*, previously neutralised to *phenol red*, add 20 millilitres of *water*, and titrate with *N/2 sodium hydroxide*, using *solution of phenol red* as indicator. Each millilitre of *N/2 sodium hydroxide* is equivalent to 0·06902 gramme of $C_7H_6O_3$.

Preparation. Unguentum Acidi Salicylici.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

ACIDUM SULPHURICUM

[Acid. Sulph.]

Sulphuric Acid

H_2SO_4 . . . . . . Mol. Wt. 98·08

Sulphuric Acid may be obtained by the oxidation and hydration of sulphur dioxide. It contains not less than 95 per cent. w/w of H_2SO_4.

Characters. A colourless, corrosive liquid of oily consistence, evolving much heat when added to water.

Tests for Identity. Strongly acid, even when diluted freely. Yields, when neutralised, the *reactions* characteristic of sulphates.

Tests for Purity. *Specific gravity* (15·5°/15·5°), about 1·84.

5 millilitres, diluted with 20 millilitres of *water* and cooled,

does not decolourise within five minutes 0·1 millilitre of *N/10 potassium permanganate* (limit of oxidisable impurities).

Add 5 millilitres to a mixture of 5 millilitres of *water* and 0·5 millilitre of *solution of indigo carmine*; the colour is not discharged within one minute (limit of nitrate).

5 millilitres, diluted with *water* and neutralised with *dilute solution of ammonia*, complies with the *limit test for chlorides.*

1 millilitre complies with the *limit test for iron.*

Arsenic limit, 5 parts per million. *Lead limit*, 20 parts per million.

Leaves, on ignition, not more than 0·01 per cent. w/w of solid residue.

Assay. Mix about 2 grammes, accurately weighed, with about 40 millilitres of *water*, and titrate with *N/1 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/1 sodium hydroxide* is equivalent to 0·04904 gramme of H_2SO_4.

Preparation. Acidum Sulphuricum Dilutum.

ACIDUM SULPHURICUM DILUTUM

[Acid. Sulph. Dil.]

Dilute Sulphuric Acid

Dilute Sulphuric Acid contains 10 per cent. w/w of H_2SO_4 (limits, 9·5 to 10·5).

Sulphuric Acid . . .	104 grammes
Distilled Water . . .	896 grammes

Add the Sulphuric Acid very gradually to the Distilled Water, and cool.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·064 to 1·073.

To 15 millilitres add 0·2 millilitre of *solution of indigo carmine* and 15 millilitres of *nitrogen-free sulphuric acid*; the colour is not discharged within one minute (limit of nitrate).

Complies with the other Tests for Purity described under 'Acidum Sulphuricum', when nine times the quantity is taken for each test.

Assay. Carry out the Assay as described under 'Acidum Sulphuricum', using about 10 grammes, accurately weighed.

DOSES

Metric.	Imperial.
0·3 to 4 mils.	5 to 60 minims.

ACIDUM TANNICUM

[Acid. Tann.]

Tannic Acid

Synonym. Tannin.

Tannic Acid may be obtained from the galls of various species of *Quercus*, by subjecting them to a special fermentation and extracting them with water-saturated ether.

Characters. Yellowish-white or light brownish, glistening scales, light masses, or an impalpable powder; odour, characteristic; taste, strongly astringent.

Soluble in 1 part of *water*, and in 1 part of *alcohol (90 per cent.)*; almost insoluble in *ether*, and in *chloroform*; very soluble in *acetone*; slowly soluble in 1 part of *glycerin*; almost insoluble in *benzene*, and in *light petroleum (boiling-point, 50° to 60°)*.

An aqueous solution produces precipitates in solutions of *gelatin*, *albumen*, and some alkaloids.

Tests for Identity. An aqueous solution is acid to *litmus*, and gives with *test-solution of ferric chloride* a bluish-black colour, which disappears on the addition of *sulphuric acid*, forming a yellowish-brown precipitate.

An aqueous solution is dextro-rotatory.

Tests for Purity. To 2 millilitres of a 20 per cent. w/v aqueous solution add 2 millilitres of *alcohol (90 per cent.)*; the solution remains clear and shows no turbidity on the addition of 1 millilitre of *ether* (limit of gums, dextrin, sugars, and salts).

Loses, when dried at 100°, not less than 6 per cent., and not more than 12 per cent., of its weight.

Leaves, on incineration, not more than 0·2 per cent. of residue.

Preparations. Glycerinum Acidi Tannici.
Suppositorium Acidi Tannici.
Trochiscus Acidi Tannici.
Unguentum Acidi Tannici.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

ACIDUM TARTARICUM

[Acid. Tart.]

Tartaric Acid

$(\cdot CHOH\cdot COOH)_2$ . . . Mol. Wt. 150·0

Tartaric acid may be prepared from potassium acid tartrate. It contains not less than 99·5 per cent. of $C_4H_6O_6$, calculated with reference to the substance dried at 100°.

Characters. Colourless crystals, or a white powder; odourless; taste, strongly acid.

Soluble in less than 1 part of *water*, and in about 2·5 parts of *alcohol* (*90 per cent.*); slightly soluble in *ether*.

Tests for Identity. Yields, when neutralised, the *reactions* characteristic of tartrates.

Tests for Purity. Dissolve 2 grammes in 40 millilitres of *water*, and add 10 millilitres of *dilute solution of ammonia* and 5 drops of *solution of sodium sulphide PbT*; the colour produced is at most only slightly deeper than that produced in a similar mixture, containing in addition 1 millilitre of *solution of potassium cyanide PbT* (limit of copper and iron).

2·5 grammes complies with the *limit test for sulphates.*

Arsenic limit, 1 part per million. *Lead limit,* 20 parts per million.

Loses, when dried at 100°, not more than 1 per cent. of its weight.

Leaves, on incineration, not more than 0·1 per cent. of residue.

Assay. Dissolve about 3 grammes, accurately weighed, in 100 millilitres of *water*, and titrate with *N/1 sodium hydroxide*, using *solution of phenolphthalein* as indicator. Each millilitre of *N/1 sodium hydroxide* is equivalent to 0·07502 gramme of $C_4H_6O_6$.

Preparation. Pulvis Effervescens Compositus.

DOSES

Metric.	Imperial.
0·3 to 2 grammes.	**5 to 30 grains.**

ACIDUM TRICHLORACETICUM

[Acid. Trichloracet.]

Trichloracetic Acid

$CCl_3 \cdot COOH$ . . . . . Mol. Wt. 163·4

Trichloracetic Acid may be prepared by the oxidation of chloral with nitric acid. It contains not less than 98 per cent. of $C_2HO_2Cl_3$.

Characters. Colourless, very deliquescent crystals, or crystalline masses; odour, pungent and characteristic.

Very soluble in *water* (about 9 in 1), in *alcohol* (*90 per cent.*), and in *ether*.

Tests for Identity. *Melting-point*, about 55°.

An aqueous solution is strongly acid, even when diluted freely.

Decomposed by warming with *solution of sodium hydroxide*, liberating chloroform, and producing a solution which yields the *reactions* for carbonates.

Tests for Purity. To a solution of 1 gramme in 10 millilitres of *water* add 0·5 millilitre of *solution of indigo carmine* and 10 millilitres of *nitrogen-free sulphuric acid*; the solution remains blue (limit of nitrates).

1 gramme complies with the *limit test for chlorides*.

Leaves, on ignition, not more than 0·05 per cent. of residue.

Assay. Mix in a small crucible about 0·2 gramme, accurately weighed, with 2 grammes of *anhydrous sodium carbonate*; invert in a larger crucible, and add 3 grammes of *anhydrous sodium carbonate* to cover the junction of the two crucibles; heat strongly and rapidly over a Bunsen flame, continue to heat for ten minutes, and cool; dissolve the residue in 45 millilitres of *water* and 7 millilitres of *nitric acid*, add 50 millilitres of *N/10 silver nitrate*, dilute to 200 millilitres with *water*, shake well, and filter. Titrate 100 millilitres of the filtrate with *N/10 ammonium thiocyanate*, using *solution of ferric ammonium sulphate* as indicator. Each millilitre of *N/10 silver nitrate* is equivalent to 0·005446 gramme of $C_2HO_2Cl_3$.

Storage. Trichloracetic Acid should be kept in a well-closed container.

ACONITUM

[Aconit.]

Aconite

Synonyms. Aconiti tuber I.A.: Aconiti Radix: Aconite Root.

Aconite is the dried root of *Aconitum Napellus* Linn. It contains not more than 2 per cent. of other organic matter.

Characters. Dark brown, obconical; usually from 4 to 10 centimetres long and from 1 to 3 centimetres wide at the crown, to which is attached the base of an aerial stem or the remains of a bud, with numerous thick rootlets, or the scars left by these. In the parenchymatous tissue of the cortex and secondary phloem, especially in the upper part of older roots, sclerenchymatous cells of varying shape with thickened lignified walls. Cambium in tranverse section, usually with 5 or 8 projecting angles, on either side of each of which is a wedge of secondary xylem; on the inner side of the cambium smaller scattered xylem bundles. Pith, large, consisting of parenchymatous cells containing starch in single grains, mostly 8 to 15 microns in diameter, or in compound grains with 2 to 4 components. Odour, slight; taste, slight, followed by a persistent tingling and by numbness.

Preparation. Linimentum Aconiti.

ACRIFLAVINA

[Acriflavin.]

Acriflavine

$C_{14}H_{14}N_3Cl,HCl$ . . . Mol. Wt. 296·1

Acriflavine is the hydrochloride of 2:8-diamino-10-methylacridinium chloride, and may be prepared by the combination of methyl *p*-toluenesulphonate with 2:8-diacetyldiaminoacridine and subsequent hydrolysis of the product with hydrochloric acid.

Characters. An orange-red or brownish-red, crystalline powder; odourless; taste, acid.

Soluble in about 3 parts of *water*, and in *alcohol* (*90 per cent.*); almost insoluble in *ether*, in *chloroform*, in fixed and volatile oils, and in *liquid paraffin*.

Tests for Identity. 0·01 gramme, dissolved in 10 millilitres of *water*, forms a deep orange-coloured fluorescent solution, which responds to the following tests:—

5 millilitres gives a red colour on the addition of a few drops of *solution of methyl orange*.

5 millilitres yields a bulky yellow precipitate on the addition of a 10 per cent. w/v aqueous solution of *sodium salicylate* (distinction from fluorescein).

Yields the *reactions* characteristic of chlorides.

Tests for Purity. 1 gramme, dissolved in 50 millilitres of warm *water*, forms a clear solution, which remains clear and free from sediment on standing in the dark for twenty-four hours.

0·2 gramme, dissolved in 100 millilitres of a warm 0·9 per cent. w/v aqueous solution of *sodium chloride*, forms a clear solution, which remains clear and free from sediment on standing in the dark for twenty-four hours.

To 10 millilitres of a 0·1 per cent. w/v aqueous solution add 1 millilitre of *solution of formaldehyde*; no precipitate is produced (limit of proflavine).

Moisten 1 gramme with *sulphuric acid*, ignite gently, again moisten with sulphuric acid, and reignite; the residue weighs not more than 0·01 gramme.

ADEPS

[Adeps]

Lard

Synonyms. Adeps Præparatus: Prepared Lard.

Lard is the purified internal fat of the hog, *Sus scrofa* Linn.

Characters. A soft, white, unctuous fat; odour, faint but not rancid. When melted, forms a clear liquid which does not deposit water on standing.

Insoluble in *water*; very slightly soluble in *alcohol (90 per cent.)*; soluble in *ether*, in *chloroform*, and in *light petroleum (boiling-point, 50° to 60°)*.

Test for Identity. Dissolve in a test tube 5 grammes in 20 millilitres of *ether*, close the tube, and set aside for about eighteen hours at 20°; crystals are deposited; mount them in either *alcohol (95 per cent.)* or a fixed oil, and examine under a microscope, having a magnifying power of about 200 diameters; the crystals have the form of flat rhomboidal plates, cut off obliquely at one end and grouped irregularly.

Tests for Purity. *Melting-point*, 34° to 41°, determined after the following preliminary treatment:—melt completely 10 to 20 grammes in a small beaker and allow to cool, stirring occasionally until a faint turbidity appears, then stir until homogeneous; set aside for five hours with the beaker in water maintained at 10° to 12°, or for twenty-four hours with the beaker in cold running water. *Refractive index* at 60°, 1·452 to 1·455; *acid value*, not more than 1·2; *saponification value*, 192 to 198; *unsaponifiable matter*, not more than 0·5 per cent.; *iodine value*, 52 to 66.

Place in a 25 millilitre stoppered cylinder 5 grammes of melted lard; add warm *ether* to the 25 millilitre mark. Stopper securely, and shake until the lard is completely dissolved. Allow the cylinder to stand at a temperature of 16° to 20° for eighteen hours. Decant the clear solution from the crystals, and wash them with three portions of 5 millilitres of cold *ether*, avoiding breaking up the deposit during the first two washings. Agitate the crystals with the third portion of *ether*, and transfer to a small filter. Wash with successive small quantities of *ether* until 15 to 20 millilitres have been used. Remove the last traces of ether by suction through the stem of the funnel. Allow the deposit to dry. Pulverise the crystals, and determine their *melting-point* in a closed 1 millimetre tube. *Melting-point,* not lower than 63°, and usually higher than 63·4° (absence of beef-fat).

Complies with the *tests for the absence of sesame oil, and of cotton-seed oil.*

Water, boiled with it, does not acquire an alkaline reaction (absence of alkalis); and, after being filtered and acidified with *nitric acid,* does not yield any *reaction* with solution of *silver nitrate* (absence of chlorides).

Preparation. Adeps Benzoinatus.

In India, Suet (Sevum) should be employed in making the official preparations for which Lard is directed to be used.

ADEPS BENZOINATUS

[Adeps Benz.]

Benzoinated Lard

Lard	1000 grammes
Benzoin, coarsely powdered .	30 grammes

Melt the Lard, add the Benzoin, and maintain at a temperature of 60° for one hour, stirring frequently; strain, and stir constantly until cold.

In India, Suet (Sevum) should be employed in making the official preparations for which Lard is directed to be used.

ADEPS LANÆ

[Adeps Lan.]

Wool Fat

Synonym. Anhydrous Lanolin.

Wool fat is the purified anhydrous fat-like substance obtained from the wool of sheep.

Characters. A pale yellow, tenacious, unctuous substance; odour, faint and characteristic.

Insoluble in *water*; sparingly soluble in cold *alcohol* (*90 per cent.*); freely soluble in *ether,* and in *chloroform.*

Tests for Identity and Purity. To 0·5 gramme, dissolved in 5 millilitres of *chloroform,* add 1 millilitre of *acetic anhydride* and 2 drops of *sulphuric acid*; a deep green colour is produced.

Melting-point, 34° to 40°; *acid value,* not more than 1; *saponification value* (two hours' boiling with the alcoholic solution of *potassium hydroxide*), 94 to 106; *iodine value* (taking 1 gramme for the determination), 18 to 32.

Completely soluble in 100 parts of boiling *dehydrated alcohol.*

Dissolve 2 grammes in 10 millilitres of *ether*, and add 2 drops of *solution of phenolphthalein*; no red colour is produced (absence of free alkali).

Boil 1 gramme with 20 millilitres of *alcohol* (*90 per cent.*) under a reflux condenser, cool, allow to stand for three hours, filter, and add to the filtrate 5 drops of a 1 per cent. w/v solution of *silver nitrate* in *alcohol* (*90 per cent.*); the turbidity, if any, is not greater than that produced by adding 5 drops of a 1 per cent. w/v solution of *silver nitrate* in *alcohol* (*90 per cent.*) to 0·5 millilitre of *N/50 hydrochloric acid* and 20 millilitres of *alcohol* (*90 per cent.*) (limit of chlorides).

Loses, when heated at 100° for one hour, not more than 0·5 per cent. of its weight.

Leaves, on incineration, not more than 0·15 per cent. of residue.

Preparation. Adeps Lanæ Hydrosus.

ADEPS LANÆ HYDROSUS

[Adeps Lan. Hydros.]

Hydrous Wool Fat

Synonym. Lanolin.

Wool Fat	700 grammes
Distilled Water . . .	300 millilitres

Melt the Wool Fat, add the Distilled Water gradually and with constant stirring.

Tests for Purity. 10 grammes, heated to constant weight on a water-bath, with stirring, yields not less than 7 grammes of a residue which complies with the tests described under 'Adeps Lanæ'.

Storage. Hydrous Wool Fat should be kept in a well-closed container, and stored in a cool place.

ADRENALINA

[Adrenal.]

Adrenaline

Synonyms. Adrenalinum: Adrenalin: Epinephrine.

$C_9H_{13}O_3N$ . . . . . Mol. Wt. 183·1

Adrenaline, *l*-*a*-3:4-dihydroxyphenyl-β-methylaminoethanol, is an active principle of the suprarenal gland, and may be prepared from an acid extract of the suprarenal glands of certain mammals, or by synthesis.

Characters. A colourless or pale buff-coloured, sphæro-crystalline powder.

Sparingly soluble in *water*; insoluble in *alcohol* (*90 per cent.*), and in *ether*; readily soluble in aqueous solutions of mineral acids, and of *sodium hydroxide*, or of *potassium hydroxide*, but not in aqueous solutions of ammonia and of the alkali carbonates.

It is not stable in a neutral or alkaline solution, which rapidly becomes red on exposure to air.

Tests for Identity. An aqueous solution is alkaline to *litmus*.

To a neutral or faintly acid solution add a 0·25 per cent. w/v aqueous solution of *ferric chloride*; an emerald-green colour develops, and, on the gradual addition of *solution of sodium bicarbonate*, this colour changes first to blue and then to red.

Tests for Purity. *Melting-point* the rate of rise of temperature being 10° per minute, 205° to 212°, with decomposition; *specific rotation* in a 4 per cent. w/v solution in *N/1 hydrochloric acid*, −50° to −53°.

Leaves, on incineration, not more than 0·01 per cent. of residue.

Storage. Adrenaline is stable, if kept dry and in a dark-coloured glass container.

Preparation. Liquor Adrenalinæ Hydrochloridi.

DOSES

Metric.	**Imperial.**
By injection.	
0·0001 to 0·0005 gramme.	**$^1/_{600}$ to $^1/_{120}$ grain.**

ÆTHER

[Æther.]

Ether

$(C_2H_5)_2O$ . . . . . Mol. Wt. 74·08

Ether is ethyl ether, and may be obtained by distilling a mixture of ethyl alcohol and sulphuric acid, and rectifying the distillate.

Characters. A colourless, transparent, very mobile liquid; odour, characteristic; taste, sweet and burning. Very volatile and inflammable; mixtures of its vapour with oxygen, air, or nitrous oxide in certain concentrations are explosive.

Soluble in 8·5 volumes of *water*; miscible in all proportions with *alcohol* (*90 per cent.*), with *chloroform*, and with fixed and volatile oils.

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), 0·720 to 0·724; *boiling-point,* 34° to 36°.

Heat 20 millilitres with 5 millilitres of *water* in a flask on a water-bath, and continue to heat for five minutes after the ether has evaporated; to the aqueous residue add 5 millilitres of a mixture of 10 drops of *solution of methyl red* and 10 millilitres of *water,* previously adjusted to *p*H 5·0 by the addition of *N/1000 sulphuric acid*; the *reaction* of the resulting solution is not less than *p*H 4·9, and not more than *p*H 5·1, as determined by comparison with *solutions* containing the same quantity of *solution of methyl red* (limit of sulphurous acid and other free acids). (Note:—neutral glass vessels and freshly boiled and cooled *water* must be used for this test.)

Place in a stoppered tube, of about 12 millilitres capacity and about 1·5 centimetres diameter, 8 millilitres of freshly prepared *solution of potassium iodide*; fill to the brim with the ether being tested, place the stopper in position so that no air bubble is enclosed, shake vigorously, and set aside in the dark for thirty minutes; the yellow colour produced, if any, is not deeper than that of 0·5 millilitre of *N/1000 iodine* diluted with 8 millilitres of *solution of potassium iodide* (limit of peroxides).

50 millilitres leaves, on evaporation and drying at 100°, not more than 0·001 gramme of residue.

Storage. Ether should be kept in a well-closed container, protected from light, and stored in a cool place.

Preparation. Spiritus Ætheris.
Tinctura Lobeliæ Ætherea.

DOSES

Metric.	**Imperial.**
1 to 4 mils.	**15 to 60 minims.**

ÆTHER ANÆSTHETICUS

[Æther. Anæsth.]

Anæsthetic Ether

Synonyms. Æther Purificatus: Purified Ether.

Anæsthetic Ether possesses the characters and responds to the tests described under 'Æther'.

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), 0·720; *boiling-point,* 34° to 35°.

Pour 10 millilitres in successive portions on to clean filter paper, and allow to evaporate spontaneously; no foreign odour is detectable at any stage of the evaporation.

Place in a stoppered tube, of about 12 millilitres capacity and about 1·5 centimetres diameter, 8 millilitres of *solution of potassium iodide and starch*; fill to the brim with a portion of the anæsthetic ether being tested, place the stopper in position so that no air bubble is enclosed, shake vigorously, and set aside in the dark for thirty minutes; no brown or reddish colour is produced (limit of peroxides).

Place 2 millilitres of *alkaline solution of potassio-mercuric iodide* in a stoppered tube, as described in the previous test, and fill the tube with a portion of the anæsthetic ether being tested; insert the stopper, shake vigorously for ten seconds, and set aside for five minutes; no colour or turbidity is produced (limit of acetone and aldehyde).

Shake vigorously in a separator 2 volumes of the anæsthetic ether being tested with 1 volume of *alcohol (20 per cent.)* and 1 volume of *water*. Allow the mixture to separate, and draw off the lower layer; 5 millilitres of this lower layer yields no reaction with the test for methyl alcohol, described under 'Alcohol'.

Storage. Anæsthetic Ether should be placed in a dry bottle, protected from light, and stored in a cool place. The bottle should be closed with a well-fitting glass stopper or with a cork covered with tin-foil.

ÆTHYLENUM

[Æthylen.]

Ethylene

C_2H_4 . . . . Mol. Wt. 28·03

Ethylene may be obtained from the products of decomposition of petroleum. It contains not less than 98 per cent. v/v of C_2H_4. For convenience in use, it may be compressed in metal cylinders.

Characters. A colourless gas; inflammable; mixtures with oxygen or air in certain concentrations are explosive; odour and taste, slightly sweet.

One volume dissolves in 9·2 volumes of *water* at 25°, in about half a volume of *alcohol (95 per cent.)* at 25°, and in about 0·05 volume of *ether* at 15·5°.

Tests for Identity. Dissolves slowly in *sulphuric acid*, but rapidly in *fuming sulphuric acid*, and in strong solution of *potassium permanganate*.

Decolourises *solution of bromine*.

Tests for Purity. Pass a volume equivalent to 1000 millilitres, measured at normal temperature and pressure, through 50 millilitres of *solution of barium hydroxide* at a rate not exceeding two bubbles per second; not more than an opalescence is produced (limit of carbon dioxide).

Pass a volume equivalent to 1000 millilitres, measured at normal temperature and pressure, through 50 millilitres of *water* to which 2 drops of *solution of methyl red* has been added; the colour of the liquid is not changed (limit of acid, and of sulphur dioxide).

Pass a volume equivalent to 1000 millilitres, measured at normal temperature and pressure, through 15 millilitres of *solution of silver ammonio-nitrate*; no turbidity, or darkening, is produced (limit of acetylene, of phosphine, of aldehydes, and of hydrogen sulphide).

Transfer a volume equivalent to 250 millilitres, measured at normal temperature and pressure, to a suitable container; add 2·5 millilitres of diluted blood (1 part of blood to 20 parts of *water*), avoiding admixture of air as far as possible. Agitate thoroughly the contents for fifteen minutes. Transfer the blood solution to a small test-tube, and add 0·04 gramme of a mixture of equal parts of *pyrogallol* and *tannic acid*. Shake the contents, and allow to stand for thirty to forty-five minutes; the precipitate assumes a greyish-brown colour (absence of carbon monoxide). If carbon monoxide is present, the precipitate remains red, the intensity of the colour depending on the amount of carbon monoxide in the ethylene being tested.

Assay. Pass a volume equivalent to 1000 to 1500 millilitres, measured at normal temperature and pressure, into a suitable gas pipette, containing either *fuming sulphuric acid* or *solution of bromine*; treat the residual gas with *solution of potassium hydroxide*; the volume of gas remaining is not greater than 2 per cent. v/v of the ethylene used, corresponding to not less than 98 per cent. v/v of C_2H_4.

Treat the gas, remaining from this assay, with *alkaline solution of pyrogallol*, and measure its volume; treat it with freshly prepared *acid solution of cuprous chloride*; no further contraction of its volume occurs (absence of carbon monoxide).

ÆTHYLIS CHLORIDUM

[Æthyl. Chlor.]

Ethyl Chloride

C_2H_5Cl . . . . . . Mol. Wt. 64·50

Ethyl chloride may be prepared by the action of hydrogen chloride on ethyl alcohol, or on Industrial Methylated

Spirit; in the latter case it contains a small variable proportion of methyl chloride. It contains not less than the equivalent of 99·5 per cent. w/w of C_2H_5Cl.

Characters. Gaseous at ordinary temperatures and pressures, but, as usually supplied, it is compressed to a colourless, mobile, inflammable and very volatile liquid. Odour, pleasant and ethereal; taste, burning.

Slightly soluble in *water*; miscible with *alcohol* (*90 per cent.*), and with *ether*.

Tests for Identity. *Specific gravity* (0°/15·5°), about 0·921; boils at about 12·5°.

The solution, obtained by hydrolysis with *solution of sodium hydroxide*, yields the *reactions* characteristic of chlorides; and, when *solution of iodine* is added and the mixture subsequently warmed, crystals of iodoform are deposited.

Tests for Purity. On evaporation, no foreign odour is detectable at any stage.

Shake 10 millilitres with 10 millilitres of *water*, and allow the ethyl chloride to evaporate spontaneously; the residual liquid complies with the following tests:—

It is neutral to *litmus* (limit of acid, or of alkali).

5 millilitres yields no turbidity with *solution of silver nitrate* (limit of ionisable chlorides).

Warm 5 millilitres with *solution of iodine* and *sodium carbonate*; no iodoform is formed (limit of ethyl alcohol).

Leaves, on evaporation, not more than 0·01 per cent. of residue.

Assay. Introduce about 1·5 grammes into a tared stoppered bottle, containing 50 millilitres of *N/2 alcoholic potassium hydroxide*, and weigh accurately; heat in a water-bath for thirty minutes, and titrate with *N/2 hydrochloric acid*, using *solution of phenolphthalein* as indicator. Each millilitre of *N/2 alcoholic potassium hydroxide* is equivalent to 0·03225 gramme of C_2H_5Cl.

AGAR

[Agar.]

Agar

Synonym. Agar-agar.

Agar is a dried gelatinous substance, obtained from *Gelidium corneum* (Huds.) Lamouroux, *G. cartilagineum* (Linn.) Gaill., and other closely allied Rhodophyceæ.

Characters and Tests for Identity. Slender, translucent, nearly colourless, lustrous strips about 4 millimetres wide; or flattened yellowish bands about 4 centimetres wide; or a greyish-white powder; swells, when immersed in water, to a gelatinous mass.

Insoluble in cold *water*, soluble when boiled with 100 parts of *water*, the solution yielding a stiff jelly when cooled.

A 0·2 per cent. w/v aqueous solution yields no precipitate with *solution of tannic acid* (distinction from gelatin).

Dissolve 0·1 gramme by boiling for five minutes with 50 millilitres of *water*; 10 millilitres of this hot solution complies with the following tests:—

Cool rapidly and add 1 drop of *N/10 iodine*; a pale yellowish colour is produced.

Cool rapidly and add 0·5 millilitre of *N/10 iodine*; a very dark purple colour is produced.

Cool slowly, set aside for two hours, and add 0·5 millilitre of *N/10 iodine*; a brownish colour is produced.

The ash, after treatment with *dilute hydrochloric acid*, exhibits sponge spicules and diatoms; of the latter *Arachnoidiscus Ehrenbergii* Baill. is especially plentiful in the case of strip agar.

Powdered Agar, when mounted in olive oil, exhibits microscopically translucent rounded or angular fragments; and, when mounted in *solution of chloral hydrate with iodine*, exhibits no starch grains.

Test for Purity. *Ash*, not more than 5 per cent.

DOSES

Metric.	**Imperial.**
4 to 16 grammes.	**60 to 240 grains.**

ALCOHOL

[Alcoh.]

Alcohol (95 per cent.)

Alcohol (95 per cent.) is a mixture of ethyl alcohol and water, obtained by the distillation of fermented saccharine liquids. It contains not more than 95·2 per cent. v/v or 92·7 per cent. w/w, and not less than 94·7 per cent. v/v or 92·0 per cent. w/w, of C_2H_6O.

Characters. A colourless, transparent, mobile, and volatile liquid; odour, characteristic and spirituous; taste, burning. Burns with a blue smokeless flame.

Miscible in all proportions with *water*, with *ether*, and with *chloroform*.

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), 0·815 to 0·817; *refractive index* at 20°, 1·3637 to 1·3639.

20 millilitres does not require more than 0·2 millilitre of *N/10 sodium hydroxide* to give a pink colour with *phenolphthalein* (limit of acidity).

20 millilitres does not require more than 0·1 millilitre of *N/10 sulphuric acid* to give a red colour with *methyl red* (limit of alkalinity).

When mixed with *water* in any proportion, the solution remains clear (limit of oily or resinous substances).

Allow 25 millilitres to evaporate spontaneously in a porcelain dish, protected from dust, until the surface of the dish is barely moist; no foreign odour is perceptible, and, on the addition of 1 millilitre of *sulphuric acid*, no red or brown colour is produced (limit of fusel oil and allied impurities).

Mix 10 millilitres with 5 millilitres of *solution of sodium hydroxide*, and set aside for five minutes; no yellow colour is produced (limit of aldehyde).

Dilute 0·5 millilitre with *water* to 5 millilitres, and add 2·0 millilitres of *solution of potassium permanganate in phosphoric acid*; set aside for ten minutes, and add 2·0 millilitres of *solution of oxalic and sulphuric acids*; to the colourless solution add 5 millilitres of *decolourised solution of magenta*, and set aside for ten minutes; no colour is produced (absence of methyl alcohol).

Leaves, on evaporation and drying at 100°, not more than 0·01 per cent. w/v of residue (limit of non-volatile matter).

DILUTE ALCOHOLS

The official Dilute Alcohols contain respectively 90 per cent. v/v (limits, 90·5 to 89·6); 80 per cent. v/v (limits, 80·3 to 79·5); 70 per cent. v/v (limits, 70·4 to 69·5); 60 per cent. v/v (limits, 60·2 to 59·7); 50 per cent. v/v (limits, 50·2 to 49·6); 45 per cent. v/v (limits, 45·3 to 44·7); 25 per cent. v/v (limits, 25·4 to 24·6), and 20 per cent. v/v (limits, 20·5 to 19·5) of ethyl alcohol. They may be prepared as described in the following paragraphs, the final adjustment of volume being made at the same temperature, about 15°, as that at which the Alcohol (95 per cent.) is measured.

1. *Alcohol (90 per cent.).*

Synonyms. Spiritus Rectificatus: Rectified Spirit.

Dilute 948 millilitres of Alcohol (95 per cent.) to 1 litre with Distilled Water. *Specific gravity* (15·5°/15·5°), 0·832 to 0·835; *refractive index* at 20°, 1·3645 to 1·3647.

2. *Alcohol (80 per cent.).*

Dilute 842 millilitres of Alcohol (95 per cent.) to 1 litre with Distilled Water. *Specific gravity* (15·5°/15·5°), 0·863 to 0·865; *refractive index* at 20°, 1·3649 to 1·3648.

3. *Alcohol (70 per cent.).*
   Dilute 737 millilitres of Alcohol (95 per cent.) to 1 litre with Distilled Water. *Specific gravity* (15·5°/15·5°), 0·889 to 0·891; *refractive index* at 20°, 1·3638 to 1·3636.
4. *Alcohol (60 per cent.).*
   Dilute 632 millilitres of Alcohol (95 per cent.) to 1 litre with Distilled Water. *Specific gravity* (15·5°/15·5°), 0·913 to 0·914; *refractive index* at 20°, 1·3618 to 1·3617.
5. *Alcohol (50 per cent.).*
   Dilute 526 millilitres of Alcohol (95 per cent.) to 1 litre with Distilled Water. *Specific gravity* (15·5°/15·5°), 0·934 to 0·935; *refractive index* at 20°, 1·3589 to 1·3587.
6. *Alcohol (45 per cent.).*
   Dilute 474 millilitres of Alcohol (95 per cent.) to 1 litre with Distilled Water. *Specific gravity* (15·5°/15·5°), 0·943 to 0·944; *refractive index* at 20°, 1·3572 to 1·3570.
7. *Alcohol (25 per cent.).*
   Dilute 263 millilitres of Alcohol (95 per cent.) to 1 litre with Distilled Water. *Specific gravity* (15·5°/15·5°), 0·9705 to 0·9713; *refractive index* at 20°, 1·3473 to 1·3467.
8. *Alcohol (20 per cent.).*
   Dilute 210 millilitres of Alcohol (95 per cent.) to 1 litre with Distilled Water. *Specific gravity* (15·5°/15·5°), 0·9755 to 0·9765; *refractive index* at 20°, 1·3442 to 1·3436.

   The Dilute Alcohols comply with all the limit tests described under 'Alcohol', and, when diluted with *water* to approximately 10 per cent. v/v of ethyl alcohol, 5 millilitres complies with the test for absence of methyl alcohol.

NOTE.—On mixing alcohol and water contraction of volume and rise of temperature occur. When such a mixture is prescribed in the *British Pharmacopœia*, the cooled liquid is to be employed.

ALCOHOL DEHYDRATUM

[Alcoh. Dehyd.]

Dehydrated Alcohol

$CH_3 \cdot CH_2OH$ . . . . Mol. Wt. 46·05

Synonyms. Alcohol Absolutum: Absolute Alcohol.

Dehydrated Alcohol is obtained by the dehydration of Alcohol (95 per cent.), and subsequent distillation. It contains not less than 99·4 per cent v/v or 99 per cent. w/w of C_2H_6O.

Characters. Similar to those of Alcohol (95 per cent.). Very hygroscopic.

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), 0·7936 to 0·7967; *refractive index* at 20°, 1·3614 to 1·3618.

Shake 10 millilitres in a well-closed vessel with about 0·5 gramme of *anhydrous copper sulphate*; the latter does not assume a blue colour (limit of water).

Complies with the Tests for Purity given under 'Alcohol'.

ALOE

[Aloe.]

Aloes

Aloes is the liquid, evaporated to dryness, which drains from the leaves cut from various species of *Aloe*; it is known in commerce as Cape, Curaçao, Socotrine, or Zanzibar aloes.

Characters. Dark brown, or greenish-brown, glassy masses, transparent in thin fragments (Cape aloes); or dark chocolate-brown, opaque masses with a dull, waxy, uniform fracture (Curaçao aloes); or hard, dark brown, opaque masses with an uneven porous fracture (Socotrine aloes); or dark, reddish-brown, opaque masses with a nearly smooth and slightly porous fracture (Zanzibar aloes). Odour, characteristic; taste, nauseous and bitter.

Almost entirely soluble in *alcohol* (*60 per cent.*).

Tests for Identity. Boil 0·5 gramme with 50 millilitres of *water*, until nearly dissolved, cool, add 0·5 gramme of *kieselguhr*, and filter; to the filtrate apply the following tests:—

To 5 millilitres add 0·2 gramme of *borax*, and heat until dissolved; add a few drops of this solution to a test-tube nearly filled with *water*; a green fluorescence is produced.

Mix 2 millilitres with 2 millilitres of freshly prepared *solution of bromine*; a copious, pale yellow precipitate is produced.

Mix 5 millilitres with 2 millilitres of *nitric acid*; with Cape aloes a yellowish-brown colour passing rapidly to a vivid green, with Curaçao aloes a deep brownish-red, with Socotrine aloes a pale brownish-yellow, and with Zanzibar aloes a yellowish-brown colour, is produced.

Tests for Purity. Loses, when dried at 100°, not more than 10 per cent. of its weight; *ash*, not more than 5 per cent.

Preparations. Pilula Aloes.
Pilula Aloes et Asafœtidæ.
Pilula Aloes et Ferri.

DOSES

Metric.	**Imperial.**
0·12 to 0·3 gramme.	**2 to 5 grains.**

ALOINUM

[Aloin.]

Aloin

Aloin is a mixture of crystalline principles, obtained from aloes.

Characters. A pale yellow, microcrystalline powder; odourless or having a faint odour of aloes; taste, intensely bitter.

Almost entirely soluble in *water*, and in *alcohol* (*90 per cent.*); very sparingly soluble in *ether*, in *chloroform*, and in *benzene*.

Test for Identity. Dissolves readily in *dilute solution of ammonia*, forming a solution, which is either red, or yellow changing to red, and has a greenish-red fluorescence.

Tests for Purity. A saturated solution in *water* is neutral, or not more than faintly acid, to *litmus*.

Place 1 gramme in a stoppered flask with 130 millilitres of *water*, and shake frequently during two hours; filter through a filter paper, which has been washed with *water*, dried in a steam-oven and tared; wash the residue on the filter with 25 millilitres of *water*, and dry at 100°; the residue weighs not more than 0·015 gramme.

Leaves, on incineration, not more than 0·5 per cent. of residue.

DOSES

Metric.	**Imperial.**
0·015 to 0·06 gramme.	**$^1/_4$ to 1 grain.**

ALUMEN

[Alum.]

Alum

Synonyms. Alumen Purificatum; Purified Alum.

Alum is either potassium aluminium sulphate, Potash Alum, $KAl(SO_4)_2,12H_2O$ (Mol. Wt. 474·4), which may be obtained by the combination of aluminium sulphate with potassium sulphate, and contains not less than 99·5 per cent. of $KAl(SO_4)_2,12H_2O$, or ammonium aluminium sulphate, Ammonia Alum, $NH_4Al(SO_4)_2,12H_2O$ (Mol. Wt. 453·3), which may be obtained by the combination of aluminium sulphate with ammonium sulphate, and contains not less than 99·5 per cent. of $NH_4Al(SO_4)_2,12H_2O$.

Characters. Colourless, transparent crystalline masses, or a white powder; taste, sweetish and astringent. When heated, it melts, and at about 200° loses its water of crystallisation with the formation of the anhydrous salt.

Very soluble in *water*; insoluble in *alcohol* (*90 per cent.*); freely soluble in *glycerin*.

Tests for Identity. Yields the *reactions* characteristic of aluminium, of potassium or of ammonium salts, and of sulphates.

Tests for Purity. (*a*) For Potash or Ammonia Alum.

Dissolve 1 gramme in 100 millilitres of *water*, add a slight excess of *dilute solution of ammonia*, boil, and filter; the filtrate is not coloured blue (absence of copper); acidify the filtrate with *acetic acid*, and add *hydrogen sulphide*; a precipitate is not produced (absence of zinc).

10 millilitres of the solution, obtained by dissolving 1 gramme in 100 millilitres of *water*, complies with the *limit test for iron*.

Arsenic limit, 5 parts per million.

(*b*) For Potash Alum.

1 gramme, warmed with 20 millilitres of *water* and 5 millilitres of *solution of sodium hydroxide*, does not evolve ammonia (absence of ammonium salts).

(*c*) For Ammonia Alum.

1 gramme, dissolved in about 100 millilitres of boiling *water*, gives a precipitate on the addition of a slight excess of *dilute solution of ammonia*, and the filtrate, on evaporation and ignition, leaves not more than 0·005 gramme of residue (limit of alkali salts).

Assay. Dissolve about 2 grammes, accurately weighed, in 300 millilitres of *water*, add 20 millilitres of *solution of ammonium chloride*, and boil with a slight excess of *dilute solution of ammonia*; filter; wash the precipitate; ignite, and weigh the residue. 1 gramme of residue is equivalent to 9·307 grammes of $KAl(SO_4)_2,12H_2O$, or to 8·894 grammes of $NH_4Al(SO_4)_2,12H_2O$.

Preparation. (**Potash Alum.**) Glycerinum Aluminis.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

AMIDOPYRINA

[Amidopyrin.]

Amidopyrine

$C_{13}H_{17}ON_3$ . . . . Mol. Wt. 231·2

Amidopyrine is 4-dimethylamino-1-phenyl-2:3-dimethyl-5-pyrazolone, and may be prepared by methylation of the reduction product of the nitroso-derivative of phenazone.

Characters. Small, colourless crystals, or a white crystalline powder; odourless; almost tasteless.

Soluble in about 18 parts of *water*, and in 2 parts of *alcohol (90 per cent.)*; readily soluble in *ether*, in *chloroform*, and in *benzene*.

An aqueous solution is slightly alkaline to *litmus*.

Tests for Identity. A solution, prepared by dissolving 1 gramme in 25 millilitres of *water*, responds to the following tests:—

To 5 millilitres add a few drops of *dilute hydrochloric acid* and 1 millilitre of *test-solution of ferric chloride*; a bluish-violet colour is produced which, on the addition of a few millilitres of *dilute sulphuric acid*, changes to violet-red.

To 5 millilitres add 5 millilitres of *solution of potassium ferricyanide*, containing a few drops of *test-solution of ferric chloride*; a dark greenish-blue colour is produced.

To 5 millilitres add 1 millilitre of *N/10 silver nitrate*; a deep violet colour is produced; set aside; a greyish-black precipitate of metallic silver is deposited.

To 5 millilitres add 2 drops of *sulphuric acid* and 2 drops of a dilute solution of *sodium nitrite*; a blue colour is produced which, when the mixture is gently warmed, slowly fades, leaving a colourless solution (distinction from phenazone).

Tests for Purity. *Melting-point*, 107° to 109°.

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

Leaves, on incineration, not more than 0·1 per cent. of residue.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

AMMONII BICARBONAS

[Ammon. Bicarb.]

Ammonium Bicarbonate

NH_4HCO_3 . . . . Mol. Wt. 79·05

Ammonium Bicarbonate may be prepared by passing carbon dioxide into a solution of ammonia. It contains not less than 98 per cent., and not more than the equivalent of 102 per cent., of NH_4HCO_3.

Characters. White crystals, or a fine, white crystalline powder; odour, slightly ammoniacal; taste, pungent. Slightly hygroscopic. Volatilises slowly at ordinary temperatures; at 60° volatilises rapidly with dissociation into ammonia, carbon dioxide, and water.

Soluble in 5½ parts of *water*; insoluble in *alcohol* (*90 per cent.*).

Tests for Identity. Yields the *reactions* characteristic of ammonium salts, and of bicarbonates.

Tests for Purity. Mix 5 grammes with 15 millilitres of *water* and 5 grammes of *citric acid*, and stir until dissolved; no tarry odour is produced (limit of tarry matter).

5 grammes, boiled with *water* until all the ammonia has been driven off, complies with the *limit test for chlorides.*

10 grammes, boiled with *water* until all the ammonia has been driven off, complies with the *limit test for sulphates.*

Boil 1 gramme with *water* until all the ammonia has been driven off, and add 5 millilitres of *dilute nitric acid FeT.*; the solution complies with the *limit test for iron.*

Arsenic limit, 2 parts per million. *Lead limit*, 5 parts per million.

Leaves, when volatilised, not more than 0·01 per cent. of residue.

Assay. Dissolve about 2 grammes, accurately weighed, in 40 millilitres of *N/1 sulphuric acid*, diluted with 50 millilitres of *water*, boil, cool, and titrate the excess of acid with *N/1 sodium hydroxide*, using *solution of methyl red* as indicator. Each millilitre of *N/1 sulphuric acid* is equivalent to 0·07905 gramme of NH_4HCO_3.

Metric.	DOSES	Imperial.
0·3 to 0·6 gramme.		**5 to 10 grains.**

AMMONII CARBONAS

[Ammon. Carb.]

Ammonium Carbonate

Ammonium Carbonate is a variable mixture of ammonium bicarbonate (NH_4HCO_3, Mol. Wt. 79·05) and ammonium carbamate ($NH_4NH_2CO_2$, Mol. Wt. 78·06), and may be obtained by subliming a mixture of ammonium sulphate and calcium carbonate. It contains the equivalent of not less than 30 per cent., and not more than 32·5 per cent., of NH_3.

Characters. Translucent, hard, crystalline masses; odour, strongly ammoniacal; taste, pungent and ammoniacal. Exposed to air, it partially dissociates and volatilises, and becomes converted into porous lumps or a white powder.

Soluble in about 4 parts of *water*; partly soluble in *alcohol (90 per cent.)*, yielding a residue of the bicarbonate.

Tests for Identity. Yields the *reactions* characteristic of ammonium salts, and of carbonates.

Tests for Purity. Mix 5 grammes with 15 millilitres of *water* and 7 grammes of *citric acid*, and stir until dissolved; no tarry odour is produced (limit of tarry matter).

10 grammes, boiled with *water* until all the ammonia has been driven off, complies with the *limit test for chlorides*, and with the *limit test for sulphates*.

Boil 2·5 grammes with *water* until all the ammonia has been driven off, and add 5 millilitres of *dilute nitric acid FeT.*; the solution complies with the *limit test for iron*.

Arsenic limit, 2 parts per million. *Lead limit*, 5 parts per million.

Leaves, when volatilised at a temperature below red heat, not more than 0·025 per cent. of residue.

Assay. Dissolve about 2 grammes, accurately weighed, in 50 millilitres of *N/1 sulphuric acid*, diluted with 50 millilitres of *water*, boil, cool, and titrate the excess of acid with *N/1 sodium hydroxide*, using *solution of methyl red* as indicator. Each millilitre of *N/1 sulphuric acid* is equivalent to 0·01703 gramme of NH_3.

Storage. Ammonium Carbonate should be kept in a well-closed container.

Preparation. Spiritus Ammoniæ Aromaticus.

DOSES

Metric.	Imperial.
0·3 to 0·6 gramme.	5 to 10 grains.

AMMONII CHLORIDUM

[Ammon. Chlorid.]

Ammonium Chloride

NH_4Cl . . . . . . Mol. Wt. 53·5

Ammonium Chloride may be obtained by neutralising ammonia with hydrochloric acid, and purifying the product. It contains not less than 99·5 per cent. of NH_4Cl, calculated with reference to the substance dried in a vacuum desiccator over sulphuric acid.

Characters. A white, crystalline, granular powder; odourless; taste, saline and cooling. Somewhat hygroscopic.

Soluble in about 3 parts of *water*, and in about 60 parts of *alcohol* (*90 per cent.*).

Tests for Identity. Yields the *reactions* characteristic of ammonium salts, and of chlorides.

Tests for Purity. Dissolve 0·5 gramme in 10 millilitres of *water*, and add 1 millilitre of *dilute sulphuric acid*; no turbidity is produced within five minutes (absence of barium).

2 grammes complies with the *limit test for sulphates.*

1 gramme complies with the *limit test for iron.*

Arsenic limit, 5 parts per million. *Lead limit*, 5 parts per million.

Loses, when dried for twenty-four hours in a vacuum desiccator over sulphuric acid, not more than 1 per cent. of its weight.

Leaves, when volatilised by gentle heat, not more than 0·1 per cent. of residue.

Assay. Dissolve about 0·2 gramme, accurately weighed, in 25 millilitres of *water* and 2 millilitres of *nitric acid*; add 50 millilitres of *N/10 silver nitrate* and sufficient *water* to produce 100 millilitres, filter, and titrate 50 millilitres with *N/10 ammonium thiocyanate*, using *solution of ferric ammonium sulphate* as indicator. Each millilitre of *N/10 silver nitrate* is equivalent to 0·00535 gramme of NH_4Cl.

DOSES

Metric.	Imperial.
0·3 to 4 grammes.	5 to 60 grains.

AMYLIS NITRIS

[Amyl. Nitris]

Amyl Nitrite

Amyl Nitrite is a liquid, consisting chiefly of the nitrites of *iso*-butylcarbinol, $(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2OH$, and *sec.*-butylcarbinol, $(C_2H_5)(CH_3)CH{\cdot}CH_2OH$, together with other nitrites of the homologous series. It may be prepared by the esterification with nitrous acid of the fraction of fusel oil, which distils between 128° and 132°. It contains not less than 90 per cent. w/w of nitrites, calculated as $C_5H_{11}O_2N$.

Characters. A clear, yellow liquid; odour, fragrant; taste, pungent and aromatic. Volatile even at low temperatures, and inflammable.

Insoluble in *water*; miscible with *alcohol* (*90 per cent.*), and with *ether*.

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), 0·874 to 0·884; *boiling-point*, not less than 85 per cent. distils between 90° and 100°.

Shake 5 millilitres with 10 millilitres of *water*, containing 1 millilitre of *N/1 sodium hydroxide* and 1 drop of *solution of phenolphthalein*; the red colour of the aqueous layer is not destroyed within one minute (limit of acid).

Shake with an equal volume of *solution of sodium hydroxide*; the aqueous layer does not acquire more than a pale yellow colour (limit of aldehydes).

Leaves, on evaporation, not more than 0·01 per cent. w/v of residue.

Assay. Dilute 5 millilitres to 100 millilitres with *alcohol* (*90 per cent.*), and carry out the Assay described under 'Spiritus Ætheris Nitrosi', using 2 millilitres of the diluted liquid. Each millilitre of moist nitric oxide under these conditions is equivalent to 0·0049 gramme of $C_5H_{11}O_2N$.

Storage. Amyl Nitrite should be kept in a well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.		Imperial.
	By inhalation.	
0·12 to 0·3 mil.		2 to 5 minims.

AMYLOCAINÆ HYDROCHLORIDUM

[Amylocain. Hydrochlor.]

Amylocaine Hydrochloride

$C_6H_5{\cdot}CO_2{\cdot}C(CH_3)(C_2H_5){\cdot}CH_2N(CH_3)_2,HCl$

Mol. Wt. 271·6

Amylocaine Hydrochloride is the hydrochloride of the benzoyl ester of methylethyldimethylaminomethylcarbinol, which may be prepared by the action of magnesium ethyl bromide on dimethylaminoacetone.

Characters. Colourless, crystalline powder; taste, bitter and followed by a transient insensibility of the tongue.

Soluble in 2 parts of *water*, and in 3 parts of *dehydrated alcohol*.

An aqueous solution is faintly acid to *litmus*, but neutral to *Congo-red*.

Tests for Identity. A 10 per cent. w/v aqueous solution, on the addition of *solution of sodium carbonate*, or of *solution of sodium hydroxide*, gives an oily precipitate of the base which does not crystallise on standing, and may be extracted with *light petroleum* (*boiling-point, 50° to 60°*).

To 5 millilitres of a 2 per cent. w/v aqueous solution add 1 millilitre of *N/10 potassium permanganate*; no crystalline precipitate is produced, but the potassium permanganate is slowly decolourised (distinction from cocaine).

An aqueous solution yields a precipitate with *solution of iodine* (distinction from orthocaine), and with *solution of potassio-mercuric iodide* (distinction from benzocaine and orthocaine).

An aqueous solution gives the *reactions* characteristic of chlorides.

Tests for Purity. *Melting-point*, 177° to 179°.

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; the solution is colourless (absence of readily carbonisable substances).

0·2 gramme leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Amylocaine Hydrochloride should be protected from light.

Sterilisation of a Solution. A solution of Amylocaine Hydrochloride for injection is sterilised by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass*.

DOSES

Metric.	**Imperial.**
By the mouth and by subcutaneous injection.	
0·02 to 0·05 gramme.	**1/3 to 3/4 grain.**
By intrathecal injection.	
0·02 to 0·1 gramme.	**1/3 to 1 1/2 grains.**

AMYLUM

[Amylum]

Starch

Starch consists of polysaccharide granules, obtained from the grains of maize, *Zea Mays* Linn.

Characters. Fine, white powder, or irregular angular masses, readily reducible to powder; odourless. Consists of polyhedral, rounded or occasionally muller-shaped grains, mostly from 10 to 20 microns in diameter, and exhibiting in the centre a distinct cavity or cleft, frequently three-rayed.

Insoluble in cold *water*, and in *alcohol (95 per cent.)*.

Yields, when boiled with fifteen times its weight of *water* and cooled, a translucent whitish jelly, which is coloured deep blue by *solution of iodine*.

Tests for Purity. Loses, when dried at 100°, not more than 14 per cent. of its weight; *ash*, not more than 0·5 per cent.

Preparation. Glycerinum Amyli.

ANETHUM

[Aneth.]

Dill

Synonyms. Anethi Fructus: Dill Fruit.

Dill consists of the dried ripe fruits of *Anethum graveolens* Linn. It contains not more than 2 per cent. of other organic matter.

Characters. Fruit, broadly oval. Mericarps, usually separate and free from the pedicel, about 4 millimetres long and 2 to 3 millimetres broad, very strongly compressed dorsally, glabrous, brown with three paler inconspicuous dorsal ridges and two paler lateral ridges extended as wings. Each mericarp normally with four dorsal vittæ and two commissural vittæ, five vascular strands, three smaller dorsal, and two larger in the wings; the carpophore usually adherent to the commissure; an outer epidermis with cuticular striations; a mesocarp with a small amount of lignified reticulate parenchyma; and an inner epidermis of tabular cells frequently having wavy walls. Endosperm, thin and flat, consisting of somewhat thick-walled parenchyma containing fixed oil, aleurone grains, and microsphæroidal crystals of calcium oxalate. Odour and taste, aromatic and characteristic.

Tests for Purity. *Ash*, not more than 11 per cent.

Preparation. Aqua Anethi Destillata.

ANTIMONII ET POTASSII TARTRAS

[Antim. et Pot. Tart.]

Potassium Antimonyltartrate

Synonyms. Antimonium Tartaratum : Tartarated Antimony : Tartar Emetic : Antimony and Potassium Tartrate.

$C_4H_4O_7SbK,\frac{1}{2}H_2O$ . . . Mol. Wt. 333·9

Potassium Antimonyltartrate may be obtained by the interaction of antimonious oxide and potassium acid tartrate. It contains not less than 99 per cent. of $C_4H_4O_7SbK,\frac{1}{2}H_2O$.

Characters. Colourless, transparent crystals, or a white granular powder; odourless; taste, sweet. Efflorescent.

Soluble in 17 parts of *water*, and in 3 parts of boiling *water*; insoluble in *alcohol* (*90 per cent.*); soluble in 20 parts of *glycerin*.

Tests for Identity. Yields the *reactions* characteristic of potassium, and of antimony, and, after removal of the antimony, the *reactions* characteristic of tartrates.

Tests for Purity. 1 gramme, dissolved in 50 millilitres of *water*, requires not more than 2·0 millilitres of either *N/100 sulphuric acid*, or *N/100 sodium hydroxide*, for neutralisation to the green colour of *bromocresol green*, indicative of *p*H 4·5 (limit of alkalinity, or of acidity).

Arsenic limit, 10 parts per million. *Lead limit*, 5 parts per million.

Assay. Dissolve about 0·5 gramme, accurately weighed, in 50 millilitres of *water*, add about 2 grammes of *sodium bicarbonate*, and titrate with *N/10 iodine*, using *mucilage of starch* as indicator. Each millilitre of *N/10 iodine* is equivalent to 0·01669 gramme of $C_4H_4O_7SbK,\frac{1}{2}H_2O$.

Sterilisation of a Solution. A solution of Potassium Antimonyltartrate for injection is sterilised by *heating in an autoclave*, or by *Tyndallisation*, or by *filtration*.

DOSES

Metric.	Imperial.
0·002 to 0·008 gramme.	1/32 to 1/8 grain.
Emetic Doses	
0·03 to 0·06 gramme.	1/2 to 1 grain.
By intravenous injection.	
0·03 to 0·12 gramme.	1/2 to 2 grains.

ANTIMONII ET SODII TARTRAS

[Antim. et Sod. Tart.]

Sodium Antimonyltartrate

$C_4H_4O_7SbNa$ . . . . Mol. Wt. 308·8

Sodium Antimonyltartrate may be obtained by the interaction of antimonious oxide and sodium acid tartrate. It contains not less than 96 per cent. of $C_4H_4O_7SbNa$, calculated with reference to the substance dried at 100°.

Characters. Colourless and transparent, or whitish, scales or powder; odourless; taste, sweetish. Hygroscopic.

Soluble in 1·5 parts of *water*; insoluble in *alcohol* (*90 per cent.*).

Tests for Identity. Yields the *reactions* characteristic of sodium, and of antimony, and, after removal of the antimony, the *reactions* characteristic of tartrates.

Tests for Purity. 1 gramme, dissolved in 50 millilitres of *water*, requires not more than 2·0 millilitres of either *N/100 sulphuric acid*, or *N/100 sodium hydroxide*, for neutralisation to the green colour of *bromocresol green* indicative of *p*H 4·5 (limit of alkalinity, or of acidity).

Lead limit, 5 parts per million.

Loses, when dried at 100°, not more than 5 per cent. of its weight.

Assay. Dissolve about 0·5 gramme, accurately weighed, in 50 millilitres of *water*, add about 2 grammes of *sodium bicarbonate*, and titrate with *N/10 iodine*. Each millilitre of *N/10 iodine* is equivalent to 0·01544 gramme of $C_4H_4O_7SbNa$.

Sterilisation of a Solution. A solution of Sodium Antimonyltartrate for injection is sterilised by *heating in an autoclave*, or by *Tyndallisation*, or by *filtration*.

DOSES

Metric.	Imperial.
0·002 to 0·008 gramme.	1/32 to 1/8 grain.

Emetic Doses

0·03 to 0·06 gramme.	1/2 to 1 grain.

By intravenous injection.

0·03 to 0·12 gramme.	1/2 to 2 grains.

ANTITOXINUM DIPHTHERICUM

[Antitox. Diphtheric.]

Diphtheria Antitoxin

CAUTION.—In any part of the British Empire in which Diphtheria Antitoxin is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Diphtheria Antitoxin is serum, or a preparation from serum, containing the antitoxic globulins, which have the specific power of neutralising the toxin formed by *Corynebacterium diphtheriæ.*

It is prepared by separating the serum from the blood of animals, which have been immunised by graded injections of the sterile filtrate from a culture of *Corynebacterium diphtheriæ* on a fluid medium. The serum may be used in the liquid form, or may be dried. The antitoxic globulins may be obtained from the serum by fractional precipitation, and the precipitate may be used either in solution, or dried. The final sterile product, whether serum, dried serum, solution of antitoxic globulins, or dried antitoxic globulins, is distributed in sterilised glass containers, which are sealed so as to exclude bacteria. An antiseptic may be added to the liquid forms.

Characters. The liquid serum is yellow or yellowish-brown. The solution of the antitoxic globulins is yellowish-brown or greenish-yellow. Both liquid forms are initially transparent, but acquire with age a faint opalescence. They are almost odourless, except for the odour of any antiseptic which may have been added. The solid forms are yellowish-white powders, or yellowish-brown flakes. When dissolved in 10 parts of *water*, they resemble the liquid forms in colour and appearance. The liquid serum does not contain more than 10 per cent. w/v of solid matter. The solution of antitoxic globulins does not contain more than 1·0 gramme of solid matter for each 5000 Units. The solid forms do not contain antiseptic, or other added substance.

Test for Identity. It renders the toxin formed by the *Corynebacterium diphtheriæ* harmless to animals.

Tests for Purity. All forms comply with the ***tests for sterility.*** All forms comply with the ***tests for freedom from abnormal toxicity.***

Assay. Determine the potency by the *biological assay of diphtheria antitoxin,* and express it in Units. Liquid preparations have a potency of not less than 500 Units per millilitre, and solid preparations a potency of not less than 5000 Units per gramme.

Storage. Diphtheria Antitoxin should be kept at as low a temperature as possible above its freezing-point. It deteriorates rapidly during the first few months after it is prepared; the subsequent rate of deterioration, when the storage temperature does not exceed 10°, is usually 5 per cent. per annum and does not exceed 10 per cent. At higher temperatures the rate of deterioration is greater; and, when the temperature lies between 15° and 20°, it may approach 20 per cent. per annum. The number of Units placed in each container must be sufficient to ensure that the number stated on the label is still present at the end of the period during which the preparation is intended to be used.

Labelling. The label or wrapper on the package, or the label on the container, states:—(1) whether the product is serum, dried serum, solution of antitoxic globulins, or dried antitoxic globulins; (2) the date after which the preparation is not intended to be used.

The label on the container states:—(1) the minimum total number of Units in the container; (2) either (*a*) the number of Units in 1 millilitre, or in 1 gramme, or (*b*) the total number of millilitres of liquid, or grammes of dried product, in the container.

DOSES

By injection.

Prophylactic	**500 to 1000 Units.**
Therapeutic	**10,000 to 20,000 Units.**

ANTITOXINUM TETANICUM

[Antitox. Tetanic.]

Tetanus Antitoxin

CAUTION.—In any part of the British Empire in which Tetanus Antitoxin is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Tetanus Antitoxin is serum, or a preparation from serum, containing the antitoxic globulins, which have the specific power of neutralising the toxin formed by *Bacillus Tetani.*

It is prepared by separating the serum from the blood of animals, which have been immunised by graded injections of the sterile filtrate from a culture of *Bacillus Tetani* in a fluid medium. The serum may be used in the liquid form, or may be dried. The antitoxic globulins may be obtained from the serum by fractional precipitation, and the precipitate may be used either in solution, or dried. The final sterile product, whether serum, dried serum, solution of antitoxic globulins, or dried antitoxic globulins, is distributed in sterilised glass containers, which are sealed so as to exclude bacteria. An antiseptic may be added to the liquid forms.

Characters. The liquid serum is yellow or yellowish-brown. The solution of the antitoxic globulins is yellowish-brown or greenish-yellow. Both liquid forms are initially transparent, but acquire with age a faint opalescence. They are almost odourless, except for the odour of any antiseptic which may have been added. The solid forms are yellowish-white powders, or yellow or yellowish-brown flakes. When dissolved in 10 parts of *water*, they resemble the liquid forms in colour and appearance. The liquid serum does not contain more than 10 per cent. w/v of solid matter. The solution of the antitoxic globulins does not contain more than 1 gramme of solid matter for each 6000 Units. The solid forms do not contain antiseptic, or other added substance.

Test for Identity. It renders the toxin formed by the *Bacillus Tetani* harmless to animals.

Tests for Purity. All forms comply with the *tests for sterility*. All forms comply with the *tests for freedom from abnormal toxicity*.

Assay. Determine the potency by the *biological assay of tetanus antitoxin*, and express it in Units. For prophylactic use, liquid preparations have a potency of not less than ~~300~~ Units per millilitre, and solid preparations of not less than ~~3000~~ Units per gramme. For therapeutic use, liquid preparations have a potency of not less than ~~1600~~ Units per millilitre, and solid preparations of not less than ~~16,000~~ Units per gramme. 5c

Storage. Tetanus Antitoxin should be kept at as low a temperature as possible above its freezing-point. The number of Units placed in each container must be sufficient to ensure that the number stated on the label is still present at the end of the period during which the preparation is intended to be used.

Labelling. The label or wrapper on the package, or the label on the container, states :—(1) whether the product is serum, dried serum, solution of antitoxic globulins, or dried antitoxic globulins; (2) whether the product is intended for prophylactic or for therapeutic use; (3) the date after which the preparation is not intended to be used.

The label on the container states:—(1) the total number of International Units in the container, and the equivalent number of the units adopted in the United States Pharmacopœia X, which will be one-half of the number of International Units; (2) either (*a*) the number of International Units in 1 millilitre, or in 1 gramme, or (*b*) the total number of millilitres of liquid, or grammes of dried product, in the container.

DOSES

By injection.

Prophylactic 1000 to 2000 Units. Not less than 3000
Therapeutic 20,000 to 40,000 Units. " " " 100,000

ANTITOXINUM WELCHICUM

[Antitox. Welchic.]

Gas-gangrene Antitoxin (perfringens)

CAUTION.—In any part of the British Empire in which Gas-gangrene Antitoxin (perfringens) is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Gas-gangrene Antitoxin (perfringens) is serum, or a preparation from serum, containing the antitoxic globulins, which have the specific power of neutralising the toxin formed by *Bacillus perfringens* (*Bacillus Welchii*).

It is prepared by separating the serum from the blood of animals, which have been immunised by graded injections of the sterile filtrate from a culture of *Bacillus perfringens* (*Bacillus Welchii*) in a fluid medium. The serum may be used in the liquid form, or may be dried. The antitoxic globulins may be obtained from the serum by fractional precipitation, and the precipitate may be used either in solution, or dried. The final sterile product, whether serum, dried serum, solution of antitoxic globulins, or dried antitoxic globulins, is distributed in sterilised glass containers, which are sealed so as to exclude bacteria. An antiseptic may be added to the liquid forms.

Characters. The liquid serum is yellow or yellowish-brown. The solution of the antitoxic globulins is yellowish-brown or greenish-yellow. Both liquid forms are initially transparent, but acquire with age a faint opalescence. They are almost odourless, except for the odour of any antiseptic which may have been added. The solid forms are yellowish-white powders, or yellowish-brown flakes. When dissolved in 10 parts of *water* they resemble the liquid forms in colour and appearance. The liquid serum does not contain more than 10 per cent. w/v of solid matter. The solution of antitoxic globulins does not contain more than 20 per cent. w/v of solid matter. The solid forms do not contain antiseptic, or other added substance.

Test for Identity. It renders the toxin formed by the *Bacillus perfringens* (*Bacillus Welchii*) harmless to animals.

Tests for Purity. All forms comply with the *tests for sterility*. All forms comply with the *tests for freedom from abnormal toxicity*.

Assay. Determine the potency by the *biological assay of gas-gangrene antitoxin* (*perfringens*), and express it in Units per millilitre for liquid preparations, and in Units per gramme for solid preparations. Liq. Prep Not less than 250 Units/ml & Solid Not

Storage. Gas-gangrene Antitoxin (perfringens) should be kept at as low a temperature as possible above its freezing-point.

The number of Units placed in each container must be sufficient to ensure that the number stated on the label is still present at the end of the period during which the preparation is intended to be used.

Labelling. The label or wrapper on the package, or the label on the container, states :—(1) whether the product is serum, dried serum, solution of antitoxic globulins, or dried antitoxic globulins ; (2) the date after which the preparation is not intended to be used.

The label on the container states :—(1) the minimum total number of Units in the container ; (2) either (*a*) the number of Units in 1 millilitre, or in 1 gramme, or (*b*) the total number of millilitres of liquid, or grammes of dried product, in the container.

DOSES

Prophylactic	**4,000 Units, by injection.**
Therapeutic	**10,000 to 20,000 Units, by intravenous injection.**

APOMORPHINÆ HYDROCHLORIDUM

[Apomorph. Hydrochlor.]

Apomorphine Hydrochloride

$C_{17}H_{17}O_2N,HCl,\frac{1}{2}H_2O$ . . Mol. Wt. 312·6

Apomorphine Hydrochloride is the hydrochloride of an alkaloid, apomorphine, obtained from morphine by the abstraction of the elements of a molecule of water.

Characters. Minute, glistening crystals; colourless or greyish-white, but assuming a greenish tint on exposure to air and light; odourless.

Soluble in 50 parts of *water*, and in *alcohol* (*90 per cent.*); sparingly soluble in *ether*, and in *chloroform*.

An aqueous solution is neutral to *litmus*.

Tests for Identity. A solution in *water* is colourless when freshly prepared, but rapidly becomes green on exposure to air and light; it is more stable if acidified with *hydrochloric acid*.

To 1 millilitre of a 1 per cent. w/v aqueous solution add *solution of sodium bicarbonate*; a colourless precipitate separates, which rapidly becomes green; the precipitate is soluble in *ether* producing a purple solution, in *chloroform* producing a blue solution, and in *alcohol* (*90 per cent.*) producing a green solution.

Yields the *reactions* characteristic of chlorides, but the precipitate, formed with *solution of silver nitrate*, darkens rapidly.

Tests for Purity. Shake 0·1 gramme with 5 millilitres of *ether*; the ether is not coloured more than faintly red (limit of decomposition products).

0·2 gramme loses, when dried at 100°, not more than 0·01 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Apomorphine Hydrochloride should be kept in a well-closed container, protected from light.

A solution of Apomorphine Hydrochloride readily decomposes.

Caution. Apomorphine Hydrochloride must be rejected, if it at once imparts an emerald-green colour to 100 parts of *water*, when shaken with it in a test-tube.

Sterilisation of a Solution. A solution of Apomorphine Hydrochloride for injection is sterilised by *Tyndallisation*, or by *filtration*. The solution readily decomposes, if over-heated. The containers comply with the *tests for limit of alkalinity of glass*.

DOSES

Expectorant Doses

Metric.	Imperial.
0·001 to 0·002 gramme.	1/64 to 1/32 grain.

Hypnotic and Emetic Doses

By subcutaneous injection.

0·002 to 0·008 gramme.	1/32 to 1/8 grain.

AQUÆ AROMATICÆ

Aromatic Waters

General Processes

(*a*) *Distillation.* Place the drug or essential oil, from which the Distilled Aromatic Water is to be prepared, in a suitable still with the specified quantity of potable water. Distil until the specified quantity of distillate has been collected. Shake the distillate thoroughly; set aside for not less than twelve hours; remove any excess of oil by filtration.

(*b*) *Solution.* Shake the essential oil, corresponding to the Aromatic Water required, with five hundred times its volume of Distilled Water. Repeat the shaking several times during a period of about fifteen minutes. Set the mixture aside for twelve hours, or overnight; filter.

Alternatively, triturate the oil with a sufficient quantity of *powdered talc*, or of *kieselguhr*, or of pulped filter paper, and five hundred times its volume of Distilled Water; filter.

(*c*) *Dilution from Concentrated Waters.* Dilute the Concentrated Water with 39 times its volume of Distilled Water.

AQUA ANETHI CONCENTRATA

[Aq. Aneth. Conc.]

Concentrated Dill Water

Oil of Dill	20 millilitres
Alcohol (90 per cent.) . .	600 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Dissolve the Oil of Dill in the Alcohol (90 per cent.), and add sufficient Distilled Water in successive small quantities to produce 1000 millilitres, shaking vigorously after each addition. Add 50 grammes of *powdered talc*, and shake; set aside for a few hours, occasionally shaking; filter.

Alcohol content, 52 to 56 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
0·3 to 1 mil.	5 to 15 minims.

Concentrated Dill Water, when diluted with 39 times its volume of Distilled Water, yields a preparation which is approximately equivalent in strength to Distilled Dill Water, but contains about 1·5 per cent. v/v of Alcohol (90 per cent.).

AQUA ANETHI DESTILLATA

[Aq. Aneth. Dest.]

Distilled Dill Water

Dill	100 grammes
Water	2000 millilitres

Distil 1000 millilitres by the process described under 'Aquæ Aromaticæ (*a*)'.

DOSES

Metric.	Imperial.
15 to 30 mils.	1/2 to 1 fluid ounce.

When Aqua Anethi, or Dill Water, is prescribed, the distilled water not being specified, Dill Water made by any of the methods described under 'Aquæ Aromaticæ' shall be dispensed.

AQUA CAMPHORÆ

[Aq. Camph.]

Camphor Water

Camphor	1 gramme
Alcohol (90 per cent.) . .	2 millilitres
Distilled Water . . .	1000 millilitres

Dissolve the Camphor in the Alcohol (90 per cent.), add the solution in successive portions to the Distilled Water, shaking after each addition; then shake occasionally, until all the Camphor is dissolved.

DOSES

Metric.	Imperial.
15 to 30 mils.	1/2 to 1 fluid ounce.

AQUA CHLOROFORMI

[Aq. Chlorof.]

Chloroform Water

Chloroform	2·5 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Dissolve the Chloroform in the Distilled Water by shaking.

DOSES

Metric.	**Imperial.**
15 to 30 mils.	**1/2 to 1 fluid ounce.**

AQUA CINNAMOMI CONCENTRATA

[Aq. Cinnam. Conc.]

Concentrated Cinnamon Water

Oil of Cinnamon	20 millilitres
Alcohol (90 per cent.)	600 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Dissolve the Oil of Cinnamon in the Alcohol (90 per cent.), and add sufficient Distilled Water in successive small quantities to produce 1000 millilitres, shaking vigorously after each addition. Add 50 grammes of *powdered talc*, and shake; set aside for a few hours, occasionally shaking; filter.

Alcohol content, 52 to 56 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
0·3 to 1 mil.	**5 to 15 minims.**

Concentrated Cinnamon Water, when diluted with 39 times its volume of Distilled Water, yields a preparation which is approximately equivalent in strength to Distilled Cinnamon Water, but contains about 1·5 per cent. v/v of Alcohol (90 per cent.).

AQUA CINNAMOMI DESTILLATA

[Aq. Cinnam. Dest.]

Distilled Cinnamon Water

Cinnamon, bruised . . .	100 grammes
Water	2000 millilitres

Distil 1000 millilitres by the process described under 'Aquæ Aromaticæ (*a*)'.

DOSES

Metric.	Imperial.
15 to 30 mils.	1/2 to 1 fluid ounce.

When Aqua Cinnamomi, or Cinnamon Water, is prescribed, the distilled water not being specified, Cinnamon Water made by any of the methods described under 'Aquæ Aromaticæ' shall be dispensed.

AQUA DESTILLATA

[Aq. Dest.]

Distilled Water

H_2O . . . . . . Mol. Wt. 18·016

Distilled Water is prepared by the distillation of potable water.

Characters. A clear, colourless, odourless, and tasteless liquid.

Tests for Purity. Separate portions of 10 millilitres remain clear and colourless on standing for five minutes, after the addition of 1 millilitre of the following test solutions:—*solution of barium chloride* (limit of sulphates), *solution of silver nitrate* (limit of chlorides).

100 millilitres remains clear and colourless on the addition of 1 drop of *solution of sodium sulphide* (limit of lead, of copper, and of iron).

50 millilitres, mixed with 2 millilitres of *alkaline solution of potassio-mercuric iodide*, when viewed in a Nessler glass standing on a white tile, does not, after five minutes, yield a more intense colour than that given by 50 millilitres of *ammonia-free water* with the addition of 2 millilitres of *dilute solution of ammonium chloride (Nessler's)*, when tested under similar conditions (limit of ammonia).

When 100 millilitres is boiled for ten minutes with 3 millilitres of *sulphuric acid* and 1 millilitre of *N/100 potassium permanganate*, the colour is not completely destroyed (limit of oxidisable matter).

Leaves, on evaporation to dryness on a water-bath, not more than 0·001 per cent. w/v of residue.

AQUA MENTHÆ PIPERITÆ CONCENTRATA

[Aq. Menth. Pip. Conc.]

Concentrated Peppermint Water

Oil of Peppermint . . .	20 millilitres
Alcohol (90 per cent.) . .	600 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Dissolve the Oil of Peppermint in the Alcohol (90 per cent.), and add sufficient Distilled Water in successive small quantities to produce 1000 millilitres, shaking vigorously after each addition. Add 50 grammes of *powdered talc*, and shake; set aside for a few hours, occasionally shaking; filter.

Alcohol content, 52 to 56 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
0·3 to 1 mil.	**5 to 15 minims.**

Concentrated Peppermint Water, when diluted with 39 times its volume of Distilled Water, yields a preparation which is approximately equivalent in strength to Distilled Peppermint Water, but contains about 1·5 per cent. v/v of Alcohol (90 per cent.).

AQUA MENTHÆ PIPERITÆ DESTILLATA

[Aq. Menth. Pip. Dest.]

Distilled Peppermint Water

Oil of Peppermint . . .	1 millilitre
Water	1500 millilitres

Distil 1000 millilitres by the process described under 'Aquæ Aromaticæ (*a*)'.

DOSES

Metric.	**Imperial.**
15 to 30 mils.	**½ to 1 fluid ounce.**

When Aqua Menthæ Piperitæ, or Peppermint Water, is prescribed, the distilled water not being specified, Peppermint Water made by any of the methods described under 'Aquæ Aromaticæ' shall be dispensed.

AQUA STERILISATA

[Aq. Steril.]

Sterilised Water

Distil potable water into a previously *sterilised* glass receiver, and transfer the freshly distilled water to a *sterilised* hard glass container. Close the container so as to exclude bacteria, and sterilise by *heating in an autoclave* or, if this is not available, by boiling for thirty minutes

Sterilised Water is used within one month after its preparation. If the whole of the contents of a container is not used when the container is opened, the container may be closed again so as to exclude bacteria, and sterilised by *heating in an autoclave* or by boiling for thirty minutes.

Tests for Purity. Complies with the Tests for Purity described under 'Aqua Destillata'.

Sterilised Water for Intravenous Injections. Sterilised Water used for the preparation of an intravenous injection should be prepared by redistilling Distilled Water from apparatus which has been cleansed with a caustic alkali or a mineral acid, rejecting the first portion of the distillate, collecting the remainder in a *sterilised* hard glass container, and sterilising by *heating in an autoclave* or by boiling for thirty minutes.

Sterilised Water for Intravenous Injections should be used within twenty-four hours after its distillation.

ARGENTI NITRAS

[Argent. Nit.]

Silver Nitrate

$AgNO_3$ . . . . . . Mol. Wt. 169·9

Silver Nitrate may be obtained by the action of nitric acid on silver. It contains not less than 99·8 per cent. of $AgNO_3$.

Characters. Colourless, tabular crystals; odourless; taste, bitter and metallic.

Soluble in about 0·5 part of *water*, and in 25 parts of *alcohol (90 per cent.)*; slightly soluble in *ether*, and in *glycerin*.

Tests for Identity. Yields the *reactions* characteristic of silver, and of nitrates.

Test for Purity. Dissolve 1 gramme in 5 millilitres of *water*, and add a slight excess of *dilute solution of ammonia*; the mixture remains clear and colourless (limit of copper, of bismuth, and of lead).

Assay. Dissolve about 0·5 gramme, accurately weighed, in 50 millilitres of *water*, add 2 millilitres of *nitric acid*, and titrate with *N/10 ammonium thiocyanate*, using *solution of ferric ammonium sulphate* as indicator. Each millilitre of *N/10 ammonium thiocyanate* is equivalent to 0·01699 gramme of $AgNO_3$.

Storage. Silver Nitrate should be protected from light.

Preparation. Argenti Nitras Induratus.

DOSES

Metric.	**Imperial.**
0·008 to 0·016 gramme.	**$^1/_8$ to $^1/_4$ grain.**

ARGENTI NITRAS INDURATUS

[Argent. Nit. Indur.]

Toughened Silver Nitrate

Synonym. Toughened Caustic.

Toughened Silver Nitrate is prepared by fusing together 95 parts of Silver Nitrate and 5 parts of Potassium Nitrate, and pouring into suitable moulds. It contains not less than 94 per cent., and not more than 96 per cent., of $AgNO_3$.

Characters. White or greyish-white, cylindrical rods or cones. Freely soluble in *water*; sparingly soluble in *alcohol (90 per cent.)*.

Tests for Identity. Yields the *reactions* characteristic of silver, of potassium, and of nitrates.

Assay. Dissolve about 0·5 gramme, accurately weighed, in 50 millilitres of *water*, add 5 millilitres of *nitric acid*, and titrate with *N/10 ammonium thiocyanate*, using *solution of ferric ammonium sulphate* as indicator. Each millilitre of *N/10 ammonium thiocyanate* is equivalent to 0·01699 gramme of $AgNO_3$.

Storage. Toughened Silver Nitrate should be protected from light.

ARSENI TRIIODIDUM

[Arsen. Triiod.]

Arsenic Triiodide

Synonyms. Arsenii Iodidum : Arsenious Iodide.

AsI_3 . . . . . . Mol. Wt. 455·7

Arsenic triiodide may be obtained by combination of arsenic and iodine, and purification of the product by crystallisation. It contains not less than 99·0 per cent. of AsI_3.

Characters. Small, orange crystals.

Soluble in 18 parts of *water*, in 42 parts of *alcohol* (*90 per cent.*), in *ether*, in *chloroform*, and in *carbon disulphide*.

Tests for Identity. A freshly prepared aqueous solution is strongly acid, and is colourless, but, on being kept, develops a yellow colour due to liberation of iodine.

Yields the *reactions* characteristic of arsenic, and of iodides.

Tests for Purity. When heated at 100°, it does not lose iodine. Leaves, on volatilisation, not more than 0·5 per cent. of residue.

Assay. Dissolve about 0·5 gramme, accurately weighed, in 50 millilitres of *water*, add about 2 grammes of *sodium bicarbonate*, and titrate with *N/10 iodine*. Each millilitre of *N/10 iodine* is equivalent to 0·02279 gramme of AsI_3.

Preparation. Liquor Arseni et Hydrargyri Iodidi.

DOSES

Metric.	**Imperial.**
0·004 to 0·016 gramme.	**$^1/_{16}$ to $^1/_4$ grain.**

ARSENI TRIOXIDUM

[Arsen. Trioxid.]

Arsenic Trioxide

Synonyms. Acidum Arseniosum : Arsenious Anhydride : Arsenious Acid.

As_2O_3 . . . . . . Mol. Wt. 197·9

Arsenic Trioxide may be obtained by roasting certain arsenical ores. It contains not less than 99·8 per cent. of As_2O_3.

Characters. A heavy, white powder; or irregular lumps having a vitreous fracture, usually appearing stratified, and containing frequently both transparent and opaque varieties.

Very slowly soluble in about 65 parts of *water*, the rate of solution depending upon the relative proportion of the two varieties present, and upon the degree of subdivision; more readily soluble in *water* on the addition of *hydrochloric acid*, or of solutions of alkali hydroxides or carbonates; slightly soluble in *alcohol* (*90 per cent.*); soluble in about 8 parts of *glycerin*.

Tests for Identity. Sublimes, on heating, with the formation of transparent octahedral crystals.

A small quantity, warmed with about 5 millilitres of *hydrochloric acid*, gives a brown colour or precipitate on the addition of a few drops of *solution of stannous chloride*.

Tests for Purity. 0·5 gramme, dissolved in 10 millilitres of *dilute solution of ammonia*, forms a clear colourless solution which, when diluted with an equal volume of *water* and acidified with *hydrochloric acid*, does not become yellow (absence of arsenious sulphide).

Leaves, on volatilisation, not more than 0·1 per cent. of residue.

Assay. Dissolve about 0·2 gramme, accurately weighed, in about 20 millilitres of boiling water and 5 millilitres of *N/1 sodium hydroxide*; cool; add 5 millilitres of *N/1 hydrochloric acid*, followed by about 3 grammes of *sodium bicarbonate*, and titrate the mixture with *N/10 iodine*. Each millilitre of *N/10 iodine* is equivalent to 0·0049475 gramme of As_2O_3.

Preparation. Liquor Arsenicalis.

DOSES

Metric.	Imperial.
0·001 to 0·005 gramme.	$^1/_{60}$ to $^1/_{12}$ grain.

ASAFŒTIDA

[Asafœt.]

Asafetida

Asafetida is an oleo-gum-resin, obtained by incision from the living rhizome and root of *Ferula fœtida* Regel, *F. rubricaulis* Boiss., or other species of *Ferula*.

Characters. Rounded or flattened tears, mostly from 12 to 25 millimetres in diameter, or in masses of agglutinated tears; greyish-white to dull yellow. The freshly exposed surface, yellowish and translucent, or milk-white and opaque, and then slowly becoming pink, red, and finally reddish-brown; touched with sulphuric acid a bright red or reddish-brown colour is produced, changing to violet when the acid is washed off with water. Odour, strong, alliaceous and persistent; taste, bitter, acrid and alliaceous.

Tests for Identity. Thoroughly triturate 0·5 gramme with 2 grammes of sand in *moderately coarse powder*, transfer to a test tube, add 5 millilitres of *alcohol* (*90 per cent.*), boil for one to two minutes, cool, and filter into 5 millilitres of *alcohol* (*90 per cent.*) to which 0·5 millilitre of *dilute solution of ammonia* has been added; no fluorescence results (distinction from galbanum).

Tests for Purity. *Ash*, not more than 15 per cent.

Contains not more than 50 per cent. of matter insoluble in *alcohol* (*90 per cent.*) as determined by the following process:—Place about 5 grammes, accurately weighed, in a small beaker furnished with a glass rod, and tared; add 50 millilitres of *alcohol* (*90 per cent.*), and boil gently. Filter the hot solution through a tared filter paper, and boil the residue with further quantities of *alcohol* (*90 per cent.*) until all soluble matter is removed, using the glass rod to disintegrate the insoluble matter. Wash the filter paper with hot *alcohol* (*90 per cent.*); transfer the paper to the beaker, dry at 100°, and weigh.

Preparations. Pilula Aloes et Asafœtidæ.
Tinctura Asafœtidæ.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	5 to 15 grains.

ATROPINA

[Atrop.]

Atropine

$C_{17}H_{23}O_3N$ . . . . Mol. Wt. 289·2

Atropine is an alkaloid, *dl*-hyoscyamine, obtained from *Atropa Belladonna* Linn., *Hyoscyamus muticus* Linn., and other plants of the Family Solanaceæ.

Characters. Colourless crystals; odourless.

Soluble in about 500 parts of *water*; freely soluble in *alcohol* (*90 per cent.*); soluble in about 16 parts of *ether*; freely soluble in *chloroform*.

A saturated aqueous solution is alkaline to *litmus*, and to *phenolphthalein*.

Tests for Identity. Dissolve 0·05 gramme in 5 millilitres of *water*, acidified with *hydrochloric acid*, and add *solution of auric chloride*; a lemon-yellow, oily precipitate is formed which rapidly crystallises. This precipitate, after recrystallisation from boiling *water* acidified with *hydrochloric acid*, has a minutely crystalline character, is dull and pulverulent when dry, and has a *melting-point* of 137° to 139° (distinction from hyoscyamine).

Add 0·01 gramme to 5 drops of *nitric acid*, and evaporate to dryness on a water bath; the residue is faintly yellow in colour, and, after cooling, assumes a violet colour on moistening with freshly prepared *alcoholic solution of potassium hydroxide* (hyoscyamine and hyoscine produce the same colour as atropine; the presence of other alkaloids masks the reaction).

Tests for Purity. *Melting-point*, 114° to 116°; *optical rotation* of a 10 per cent. w/v solution in *alcohol* (*60 per cent.*) in a 2 decimetre tube, not greater than + 0·1° or − 0·1° (limit of *l*-hyoscyamine).

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; the solution is colourless (limit of readily carbonisable substances); add 1 drop of *nitric acid*; not more than a pale yellow colour is produced (absence of many other alkaloids).

To 10 millilitres of a 1·25 per cent. w/v solution in *water*, slightly acidified with *hydrochloric acid*, add 4 millilitres of *dilute solution of ammonia*; the solution does not become cloudy immediately (absence of apoatropine).

0·2 gramme leaves, on incineration, not more than 0·0002 gramme of residue.

DOSES

Metric.	Imperial.
0·00025 to 0·001 gramme.	**$^1/_{240}$ to $^1/_{60}$ grain.**

ATROPINÆ SULPHAS

[Atrop. Sulph.]

Atropine Sulphate

$(C_{17}H_{23}O_3N)_2,H_2SO_4,H_2O$. Mol. Wt. 694·5

Atropine Sulphate is the sulphate of the alkaloid, Atropine.

Characters. Colourless crystals; odourless.

Soluble in less than 1 part of *water*, and in 4 parts of *alcohol* (*90 per cent.*).

An aqueous solution is neutral to *litmus*.

Tests for Identity. A 2 per cent. w/v aqueous solution yields with *solution of sodium hydroxide* a white precipitate which, when washed and dried, responds to the tests for identity described under 'Atropina'.

Yields the *reactions* characteristic of sulphates.

Tests for Purity. *Melting-point*, after drying at 136°, 195° to 196°; *optical rotation* of a 10 per cent. w/v solution in *water* in a 2 decimetre tube, not greater than + 0·1° or − 0·1° (limit of hyoscyamine).

To 10 millilitres of a 2 per cent. w/v solution in *water* add 4 millilitres of *dilute solution of ammonia*; the solution does not become cloudy immediately (absence of apoatropine).

0·2 gramme loses, when dried at 105°, not more than 0·006 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Sterilisation of a Solution. A solution of Atropine Sulphate for injection is sterilised by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass*.

Preparations. Lamella Atropinæ.
Oculentum Atropinæ.
Oculentum Atropinæ cum Hydrargyri Oxido.

DOSES

Metric.	Imperial.
0·00025 to 0·001 gramme.	1/240 to 1/60 grain.

AURANTII CORTEX RECENS

[Aurant. Cort. Rec.]

Fresh Bitter-Orange Peel

Fresh Bitter-Orange Peel is the fresh outer part of the pericarp of the ripe, or nearly ripe, fruit of *Citrus Aurantium* Linn.

Characters. Thin strips with but little of the white spongy part of the pericarp attached. Outer surface, red or deep orange-red and pitted. Epidermal cells, small and polygonal; below the epidermis, parenchymatous tissue containing large oil glands and numerous crystals of calcium oxalate. Odour, fragrant; taste, aromatic and bitter.

Preparations. Tinctura Aurantii.
Syrupus Aurantii.

AURANTII CORTEX SICCATUS

[Aurant. Cort. Sicc.]

Dried Bitter-Orange Peel

Synonym. Aurantii Amari Cortex.

Dried Bitter-Orange Peel is the dried outer part of the pericarp of the ripe, or nearly ripe, fruit of *Citrus Aurantium* Linn.

Characters. Thin, narrow strips; outer surface dark orange-red, rough, pitted; inner surface retaining not more than a very small amount of the white spongy part of the pericarp. Below the small-celled epidermis, numerous large oil glands and prismatic crystals of calcium oxalate. Fracture, short. Odour, aromatic; taste, aromatic and bitter.

Preparations. Infusum Aurantii Concentratum.
Infusum Aurantii Recens.

BALSAMUM PERUVIANUM

[Bals. Peruv.]

Balsam of Peru

Balsam of Peru is a viscid balsam, exuded from the trunk of *Myroxylon Pereiræ* (Royle) Klotzsch, after the bark has been beaten and scorched. It contains not less than 53 per cent. of balsamic esters, which have a *saponification value* of not less than 235.

Characters. A viscid liquid, dark brown in bulk, but reddish-brown and transparent in thin layers, free from stickiness or stringiness; odour, agreeable, balsamic and vanilla-like; taste, acrid and slightly bitter.

Insoluble in *water*; soluble in 1 volume of *alcohol (90 per cent.)*, but on the further addition of two or more volumes of *alcohol (90 per cent.)* the solution becomes turbid; partially soluble in *ether*; soluble in *chloroform*; partially soluble in *light petroleum (boiling-point, 50° to 60°)*, and in *glacial acetic acid.*

Test for Identity. *Specific gravity* (15·5°/15·5°), 1·140 to 1·170.

Tests for Purity. Shake 1 gramme with a solution of 3 grammes of *chloral hydrate* in 2 millilitres of *water*; a clear solution is produced (absence of fatty oils).

Shake 2 grammes thoroughly with 10 millilitres of *light petroleum* (*boiling-point, 50° to 60°*), filter, and evaporate 4 millilitres of the filtrate on a water-bath; the residue has no odour of benzaldehyde, or of turpentine (absence of benzaldehyde, and of turpentine).

Assay. Dissolve 1 gramme in 30 millilitres of *ether*, and shake in a separator with two successive quantities of 20 and 10 millilitres of *N/2 sodium hydroxide*, separating the alkaline solutions. Mix them and shake with 10 millilitres of *ether*, drawing off and rejecting the alkaline solution. Add the second ethereal solution to that first obtained. Wash the mixed ethereal solutions with two successive quantities of 5 millilitres of *water*. Transfer the ethereal solution thus washed to a tared wide-mouthed flask, evaporate at a gentle heat until the odour of ether has disappeared, add 1 millilitre of *dehydrated alcohol*, dry at 100° for thirty minutes, and weigh the balsamic esters. To this residue add 20 millilitres of *N/2 alcoholic potassium hydroxide* and 20 millilitres of *alcohol* (*90 per cent.*). Attach a reflux condenser, and boil for thirty minutes. Titrate the solution with *N/2 sulphuric acid*, using *solution of phenolphthalein* as indicator. Each gramme of the residue requires not less than 8·4 millilitres of *N/2 alcoholic potassium hydroxide* for complete saponification (corresponding to a *saponification value* of not less than 235).

DOSES

Metric.	Imperial.
0·3 to 1 mil.	5 to 15 minims.

BALSAMUM TOLUTANUM

[Bals. Tolu.]

Balsam of Tolu

Synonym. Tolu.

Balsam of Tolu is a solid, or semi-solid, balsam, obtained by incision from the trunk of *Myroxylon Toluifera* H.B. and K. It contains 19 to 25 per cent. of free balsamic acids, and 35 to 50 per cent. of total balsamic acids, both being calculated with reference to the dry alcohol-soluble matter.

Characters. A soft, tenacious, brownish-yellow or brown solid, when first imported, subsequently becoming harder and finally brittle. Transparent in thin films. Odour, aromatic and vanilla-like; taste, aromatic. Warmed and pressed between pieces of glass and examined with a lens, it exhibits crystals of cinnamic acid.

Soluble in *alcohol* (*90 per cent.*), in *ether*, in *chloroform*, and in solutions of fixed alkalis, usually leaving some insoluble residue.

Tests for Identity. A solution in *alcohol* (*90 per cent.*) is acid to *litmus*.

To a solution in *alcohol* (*90 per cent.*) add *test-solution of ferric chloride*; a green colour is produced.

Add 1 gramme to 5 millilitres of *water*, heat to boiling, filter, add 0·03 gramme of *potassium permanganate*, and heat; the odour of benzaldehyde is produced.

Tests for Purity. *Acid value*, determined as described below, 97 to 160; *ester value*, 47 to 95; *saponification value*, 170 to 224; all calculated with reference to the dry alcohol-soluble matter.

Determination of *acid value*:—Dissolve 5 grammes in 50 millilitres of boiling *alcohol* (*90 per cent.*), add 3 millilitres of *solution of phenolphthalein*, titrate the hot solution with *N/1 alcoholic potassium hydroxide* until the colour becomes dark brown; attach to a reflux condenser, boil for a few minutes to break up the precipitate, and complete the titration.

Contains not more than 4 per cent. of matter insoluble in *alcohol* (*90 per cent.*), as determined by the following process:—Digest 2·5 grammes with 50 millilitres of *alcohol* (*90 per cent.*), and filter through a tared filter paper; transfer the residue to the filter paper with the aid of more *alcohol* (*90 per cent.*), and wash with hot *alcohol* (*90 per cent.*) until all soluble matter is removed; dry at 100°, and weigh.

Add 5 grammes to 25 millilitres of *carbon disulphide*, and warm gently on a water-bath, with agitation, under a reflux condenser; filter, evaporate the solution to dryness, dissolve the residue in 6 millilitres of *light petroleum* (*boiling-point, 50° to 60°*), and shake with 10 millilitres of *dilute solution of copper acetate*; the light petroleum layer is not coloured green (absence of colophony).

Loses, when dried as a thin layer in vacuo over *sulphuric acid*, not more than 4 per cent. of its weight.

Assay. Carry out the *methods for the determination of total balsamic acids and free balsamic acids.*

Preparations. Syrupus Tolutanus.
Tinctura Tolutana.

DOSES

Metric.	**Imperial.**
0·3 to 1 gramme.	**5 to 15 grains.**

BARBITONUM

[Barbiton.]

Barbitone

Synonym. Barbital.

$(C_2H_5)_2\overline{C\cdot CO\cdot NH\cdot CO\cdot NH\cdot CO}$. Mol. Wt. 184·1

Barbitone is 5 : 5-diethylbarbituric acid, and may be obtained by the condensation of ethyl diethylmalonate with urea.

Characters. A white, crystalline powder; odourless; taste, faintly bitter.

Soluble in about 170 parts of *water*, in *alcohol* (*90 per cent.*), in *ether*, in *chloroform*, and in aqueous solutions of alkali hydroxides and of alkali carbonates.

Tests for Identity. A saturated aqueous solution is acid to *litmus*.

To 25 millilitres of a saturated solution, acidified with *nitric acid*, add a few drops of *solution of mercury nitrate*; a gelatinous precipitate is produced.

When fused with a caustic alkali, or when boiled with a strong solution of caustic alkali, it evolves ammonia.

Tests for Purity. *Melting-point*, 189° to 192°.

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

Dissolve 0·5 gramme in a slight excess of *solution of sodium hydroxide*, extract with *ether*, and evaporate; the residue weighs not more than 0·0005 gramme (limit of neutral and basic substances).

Leaves, on incineration, not more than 0·05 per cent. of residue.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

BARBITONUM SOLUBILE

[Barbiton. Solub.]

Soluble Barbitone

Synonym. Soluble Barbital.

$(C_2H_5)_2\overline{C\cdot CO\cdot NH\cdot CO\cdot NNa\cdot CO}$. Mol. Wt. 206·1

Soluble Barbitone is the monosodium derivative of

5 : 5-diethylbarbituric acid, and may be obtained by the interaction of Barbitone and sodium hydroxide. It contains not less than 97 per cent. of $C_8H_{11}O_3N_2Na$.

Characters. A white, crystalline powder; odourless; taste, bitter.

Soluble in about 6 parts of *water*; slightly soluble in *alcohol (90 per cent.)*; insoluble in *ether*, and in *chloroform*.

Tests for Identity. A 5 per cent. w/v aqueous solution is alkaline to *litmus*, and yields a crystalline precipitate of barbitone on the addition of *dilute hydrochloric acid*.

The residue, left after incineration, yields the *reactions* characteristic of sodium.

Tests for Purity. Shake 0·5 gramme with 20 millilitres of *ether*, filter, evaporate the filtrate, and dry the residue at 100°; the residue weighs not more than 0·003 gramme (limit of free barbitone, and of neutral and basic substances).

Assay. Dissolve about 0·5 gramme, accurately weighed, in 5 millilitres of *water*, add a slight excess of *dilute sulphuric acid*, and extract the liberated barbitone by shaking with successive portions of *ether*. Remove the ether, and dry the residue at 100°. 1 gramme of the residue is equivalent to 1·119 gramme of $C_8H_{11}O_3N_2Na$.

Storage. Soluble Barbitone should be kept in a well-closed container.

Sterilisation of a Solution. A solution of Soluble Barbitone for injection is sterilised by *heating in an autoclave*, or by *Tyndallisation*, or by *filtration*.

DOSES

Metric.	Imperial.
0·3 to 0·6 gramme.	**6 to 10 grains.**

BARII SULPHAS

[Barii Sulphas]

Barium Sulphate

$BaSO_4$ . . . . . . Mol. Wt. 233·4

Barium Sulphate may be prepared by the interaction of a soluble barium salt and a soluble sulphate.

Characters. A heavy, white, amorphous powder; odourless; tasteless. Stable in air.

Insoluble in *water*; very slightly soluble in *hydrochloric acid*, in *nitric acid*, and in solutions of many salts.

Tests for Identity. Moistened with *hydrochloric acid* and heated on platinum wire in a Bunsen flame, it imparts a green colour to the flame.

Boil 1 gramme with 5 millilitres of *hydrochloric acid*, cool, dilute with three times its volume of *water*, and filter; the filtrate gives a precipitate with *dilute sulphuric acid*, and with *solution of barium chloride*.

Tests for Purity. Boil 10 grammes with 30 millilitres of *acetic acid* and 70 millilitres of *water* for ten minutes, replacing water lost by evaporation, and filter. Evaporate 50 millilitres of the clear filtrate to dryness on a water-bath; the residue weighs not more than 0·025 gramme (limit of acid-soluble matter). Digest this residue with 20 millilitres of *water* for five minutes, and filter; to the clear filtrate add 1 millilitre of *dilute sulphuric acid*; no turbidity or precipitate is produced after standing for one hour (limit of soluble barium compounds). To the remainder of the filtrate from the acetic acid digestion, add an equal volume of *solution of hydrogen sulphide*; no darkening or precipitate is produced (limit of copper, of lead, of mercury, of tin, and of zinc).

Digest 1 gramme with 20 millilitres of freshly boiled *water* for five minutes; the water remains neutral to *litmus* (limit of acid or alkali).

Boil 2 grammes with 5 millilitres of *nitric acid* and 5 millilitres of *water*, cool, and filter; the filtrate gives no yellow precipitate on adding 5 millilitres of *solution of ammonium molybdate* and allowing it to stand in a warm place for one hour (limit of phosphate).

Loses, when dried at 110°, not more than 2 per cent. of its weight.

Arsenic limit, 1 part per million.

The lead paper in the *arsenic limit test* shows no more blackening than that produced in the preparation of a standard stain (limit of sulphide, of sulphite, and of thiosulphate).

BELLADONNA PULVERATA

[Bellad. Pulverat.]

Powdered Belladonna Leaf

Synonym. Pulvis Belladonnæ.

Powdered Belladonna Leaf is Belladonna Leaf, reduced to a *fine powder* and adjusted, if necessary, by the admixture of powdered exhausted Belladonna Leaf to contain 0·3 per cent. of alkaloids, calculated as hyoscyamine (limits, 0·28 to 0·32).

Test for Purity. *Ash*, not more than 15 per cent.; *acid-insoluble ash*, not more than 3 per cent.

Assay. Carry out the Assay as directed under 'Belladonnæ Folium', using 10 grammes.

Storage. Powdered Belladonna Leaf must be kept in an air-tight container.

DOSES

Metric.	Imperial.
0·03 to 0·2 gramme.	**$^1/_2$ to 3 grains.**

Powdered Belladonna Leaf contains in 0·2 gramme 0·0006 gramme, and in 3 grains about $^1/_{100}$ grain, of the alkaloids of Belladonna Leaf, calculated as hyoscyamine.

BELLADONNÆ FOLIUM

[Bellad. Fol.]

Belladonna Leaf

Belladonna Leaf consists of the leaves and tops of *Atropa Belladonna* Linn., collected when the plant is in flower, and dried. It contains not more than 2 per cent. of other organic matter, not more than 20 per cent. of its stem, not more than 1 per cent. of its stem having a width greater than 5 millimetres, and not less than 0·3 per cent. of the alkaloids of Belladonna Leaf, calculated as hyoscyamine.

Characters. Leaves alternate, usually in pairs each consisting of a larger and a smaller leaf; pale yellowish-green, thin and brittle; lamina mostly 5 to 25 cm. long and 2·5 to 12 cm. wide; entire, broadly ovate, with an acuminate apex; somewhat decurrent and only slightly hairy; petiole mostly from 0·5 to 4 cm. long. In the axils of many pairs of leaves a drooping flower borne upon a short stalk; corolla about 2·5 cm. long and 1·2 cm. wide, campanulate, livid purple, with 5 small reflexed lobes. Stamens, five, epipetalous; ovary, superior bilocular with numerous ovules and axile placentation. Epidermal cells of the leaves with a striated cuticle and, in surface view, wavy walls; stomata of solanaceous type on both surfaces; one layer of palisade cells; in the mesophyll, numerous idioblasts filled with microsphenoidal crystals of calcium oxalate; in the midrib, groups of perimedullary phloem. The stem possesses fibres in the pericycle and xylem, large vessels in the xylem, and perimedullary phloem in the pith; crystals and idioblasts similar to those of the leaf are also present in the parenchyma.

Tests for Purity. *Ash,* not more than 15 per cent.; *acid-insoluble ash,* not more than 3 per cent.

Assay. Introduce 10 grammes in *No. 60 powder* into a flask, and add 50 millilitres of a mixture of 4 volumes of *ether* and 1 volume of *alcohol (95 per cent.).* Shake well, set aside for ten minutes, add 1·5 millilitres of *dilute solution of ammonia,* and shake frequently during one hour. Transfer the mixture to a small percolator plugged with cotton wool, and, when the liquid ceases to flow, pack firmly, and continue the percolation first with a further 25 millilitres of the ether-alcohol mixture, and then with *ether,* until *complete extraction* of the alkaloids is effected. The total time of percolation should not exceed three hours. To the percolate add 20 millilitres of *N/2 hydrochloric acid,* shake well, allow to separate, and run off the lower layer. Continue the extraction with portions of 10 millilitres of a mixture of 3 volumes of *N/10 hydrochloric acid* and 1 volume of *alcohol (95 per cent.),* until *complete extraction* of the alkaloids is effected. Wash the mixed acid solutions with about 10 millilitres of *chloroform,* and run off the latter into a second separator containing 20 millilitres of *N/10 hydrochloric acid,* shake, allow to separate, and reject the chloroform. Repeat the extraction of the liquid in the first separator with two further quantities of 5 millilitres each of *chloroform,* transferring each to the second separator and washing with the same aqueous acid liquid as before. Transfer the acid liquid from the second separator to the first separator, make distinctly alkaline with *dilute solution of ammonia,* and shake with successive portions of *chloroform,* until *complete extraction* of the alkaloids is effected. Wash the combined chloroform solutions with about 3 millilitres of *water.* Remove the chloroform, add to the residue 2 millilitres of *dehydrated alcohol,* evaporate to dryness, and dry for half an hour at 100°. Dissolve the residue in 20 millilitres of *N/50 sulphuric acid,* and titrate with *N/50 sodium hydroxide,* using *solution of methyl red,* or *tincture of cochineal,* as indicator. Each millilitre of *N/50 sulphuric acid* is equivalent to 0·005784 gramme of hyoscyamine.

Storage. Belladonna Leaf should be stored in a dry place.

Preparations. Belladonnæ Pulverata.
Extractum Belladonnæ Siccum.
Tinctura Belladonnæ.

When Belladonnæ Folium is prescribed, Belladonna Pulverata shall be dispensed.

BELLADONNÆ RADIX

[Bellad. Rad.]

Belladonna Root

Belladonna Root is the dried root of *Atropa Belladonna* Linn. It contains not more than 4 per cent. of other organic matter, and not less than 0·4 per cent. of the alkaloids of Belladonna Root, calculated as hyoscyamine.

Characters. Nearly cylindrical, entire or longitudinally split, sparingly branched, up to about 4 centimetres in diameter at the crown; fracture, short; externally, pale greyish-brown; internally, whitish to brownish. In the xylem, scattered groups of pitted vessels, tracheids and fibres, mostly grouped near the cambium ring and assuming a radiate arrangement near the crown of the root. In the parenchymatous tissue, scattered cells containing microsphenoidal crystals of calcium oxalate; starch grains, mostly simple, sometimes compound, with about 3 components, individual grains up to about 30 microns in diameter.

Test for Purity. *Acid-insoluble ash*, not more than 4 per cent.

Assay. Carry out the Assay as directed under 'Belladonnæ Folium'.

Preparations. Emplastrum Belladonnæ.
Extractum Belladonnæ Liquidum.
Suppositorium Belladonnæ.
Linimentum Belladonnæ.

DOSES

Metric.	**Imperial.**
0·03 to 0·12 gramme.	**1/2 to 2 grains.**

BENZOCAINA

[Benzocain.]

Benzocaine

Synonym. Ethyl Aminobenzoate.

$NH_2\cdot C_6H_4\cdot CO_2\cdot C_2H_5$ [$NH_2 : CO_2\cdot C_2H_5 = 1 : 4$]
Mol. Wt. 165·1

Benzocaine is ethyl *p*-aminobenzoate, and may be prepared by the reduction of ethyl *p*-nitrobenzoate.

Characters. A white, crystalline powder; odourless; taste, slightly bitter, followed by a sensation of numbness.

Soluble in about 2500 parts of *water*, in 8 parts of *alcohol* (*90 per cent.*), in 4 parts of *ether*, in 2 parts of *chloroform*, and in about 50 parts of fixed oils.

Tests for Identity. A saturated aqueous solution, or a solution in *alcohol* (*90 per cent.*), is neutral to *litmus*.

0·01 gramme, dissolved in 1 millilitre of *water*, containing 1 drop of *dilute hydrochloric acid*, on the addition of 2 drops of a 10 per cent. w/v aqueous solution of *sodium nitrite*, followed by 2 drops of a solution of 0·01 gramme of *β-naphthol* in 5 millilitres of *solution of sodium hydroxide*, gives a deep red colour and, on standing, a scarlet precipitate.

A 2 per cent. w/v aqueous solution, made with the addition of sufficient *dilute hydrochloric acid*, yields a precipitate with *solution of iodine* (distinction from orthocaine); but yields no precipitate with *solution of potassio-mercuric iodide* (distinction from amylocaine hydrochloride and procaine hydrochloride).

It is extracted by *ether* from solutions in dilute acids.

Tests for Purity. *Melting-point*, 90° to 91°.

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

Dissolve 1 gramme in 10 millilitres of *alcohol* (*90 per cent.*), previously neutralised to *phenolphthalein* with *N/10 sodium hydroxide*; a clear, colourless solution is produced, which, after dilution with 10 millilitres of *water* and the addition of 2 drops of *solution of phenolphthalein*, requires not more than 1 drop of *N/10 sodium hydroxide* to produce a red colour (limit of free acid).

0·2 gramme leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Benzocaine should be kept in a well-closed container, protected from light.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

BENZOINUM

[Benzoin.]

Benzoin

Benzoin is a balsamic resin, obtained from the incised stem of *Styrax Benzoin* Dryand.; it is known in commerce as Sumatra benzoin. It contains not less than 19 per cent., and not more than 29 per cent., of free balsamic acids, and not less than 30 per cent., and not more than 60 per cent., of total balsamic acids, both being calculated with reference to the dry alcohol-soluble matter.

Characters. Hard, brittle masses consisting of whitish or reddish tears embedded in a greyish-brown to reddish-brown translucent matrix. Odour, agreeable and balsamic; taste, slightly acrid.

Tests for Identity. When slowly heated in a dry test-tube, it melts and evolves irritating whitish fumes, which condense to form a whitish crystalline sublimate in the upper part of the tube.

Heat on a water-bath 0·5 gramme with 10 millilitres of *solution of potassium permanganate*; a faint odour of benzaldehyde is produced.

Tests for Purity. *Acid value*, determined on the alcohol-soluble matter from 5 grammes by the method described under 'Balsamum Tolutanum', 115 to 163; *ester value*, 47 to 83; *saponification value*, 169 to 223; all calculated with reference to the dry alcohol-soluble matter. *Ash*, not more than 2 per cent.

Leaves, on *continuous extraction* with *alcohol* (*90 per cent.*), not more than 20 per cent. of insoluble residue, dried at 100°.

Loses, when coarsely powdered and dried in vacuo over *sulphuric acid*, not more than 10 per cent. of its weight.

Assay. Carry out the *methods for the determination of total balsamic acids and free balsamic acids.*

Preparation. Tinctura Benzoini Composita.

DOSES

Metric.	**Imperial.**
0·6 to 2 grammes.	**10 to 30 grains.**

BETANAPHTHOL

[Betanaph.]

Betanaphthol

Synonym. Naphthol.

$C_{10}H_7OH$ . . . . Mol. Wt. 144·1

Betanaphthol, β-hydroxynaphthalene, may be prepared by the fusion of sodium naphthalene-β-sulphonate with sodium hydroxide.

Characters. White, or nearly white, crystalline lamellæ or powder; odour, faint and resembling that of phenol.

Soluble in about 1000 parts of *water*, in 2 parts of *alcohol* (*90 per cent.*), in *ether*, in 17 parts of *chloroform*, in *glycerin*, in *olive oil*, and in solutions of alkali hydroxides.

Test for Identity. To 10 millilitres of a cold saturated aqueous solution add 1 millilitre of *dilute solution of ammonia*; a faint bluish fluorescence is produced.

Tests for Purity. *Melting-point*, 120° to 122°.

Dissolve 0·1 gramme in 10 millilitres of boiling *water*, and add 1 millilitre of *test-solution of ferric chloride*; a white precipitate is produced, which, on heating, becomes brown but not violet (absence of α-naphthol).

Dissolve 0·5 gramme in 25 millilitres of *dilute solution of ammonia*; no residue remains (absence of naphthalene), and the solution is not darker than pale yellow (absence of other organic substances).

Shake 1 gramme with 100 millilitres of *water* at frequent intervals during fifteen minutes, and filter; the filtrate is neutral to *litmus*.

Leaves, on incineration, not more than 0·05 per cent. of residue.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

BISMUTHI CARBONAS

[Bism. Carb.]

Bismuth Carbonate

Synonyms. Bismuth Oxycarbonate: Bismuth Subcarbonate.

Bismuth Carbonate is a basic salt of varying composition, obtained by the interaction of bismuth nitrate and a soluble carbonate.

Characters. A white or creamy-white powder; odourless; tasteless. Stable in air.

Insoluble in *water*, and in neutral organic solvents; completely soluble with effervescence in *nitric acid*, and in *hydrochloric acid*.

Tests for Identity. Yields the *reactions* characteristic of bismuth, and of carbonates.

Tests for Purity. Dissolve 3 grammes in about 4 millilitres of warm *nitric acid*, and pour the solution into 100 millilitres of *water*; filter; wash; evaporate the filtrate on a water-bath to 30 millilitres, and again filter; 5 millilitres of the filtrate complies with the following tests:—

Add 5 millilitres of *dilute sulphuric acid*; no opalescence is produced (limit of lead).

Add a slight excess of *dilute solution of ammonia*; a white precipitate is produced, and the supernatant liquid shows no bluish tint (limit of copper).

Dissolve 1 gramme in 4 millilitres of *hydrochloric acid*, dilute to 20 millilitres with *water*, and boil; add 0·5 millilitre of *solution of barium chloride*; no turbidity is produced within five minutes (limit of sulphates).

Dissolve 2·5 grammes in 10 millilitres of *hydrochloric acid*, and to the clear solution add two drops of *solution of potassium iodide*; no turbidity or opalescence is produced (absence of silver).

Boil 1 gramme with 20 millilitres of a mixture of equal volumes of *acetic acid* and *water*; cool, filter, wash, and to the filtrate add 2 millilitres of *dilute hydrochloric acid* and 20 millilitres of *water*. Boil the solution, and pass in *hydrogen sulphide* until no further precipitate is produced; filter, and wash the precipitate; evaporate the filtrate and washings to dryness, and ignite the residue gently with 1 drop of *sulphuric acid*; the residue weighs not more than 0·01 gramme (limit of alkalis and alkaline earths).

Mix 0·5 gramme with 20 millilitres of *water*; add 30 millilitres of *solution of indigo carmine*, followed rapidly by 50 millilitres of *nitrogen-free sulphuric acid* in two approximately equal portions. Boil, and set aside for one minute; the blue colour is not entirely discharged (limit of nitrates).

0·25 gramme, dissolved in *water* by the addition of 6 millilitres of *nitric acid*, complies with the *limit test for chlorides*.

Arsenic limit, 2 parts per million.

Leaves, on ignition, not less than 89 per cent., and not more than 91 per cent., of residue.

Preparation. Trochiscus Bismuthi Compositus.

DOSES

Metric.	**Imperial.**
0·6 to 2 grammes.	**10 to 30 grains.**

BISMUTHI SALICYLAS

[Bism. Salicyl.]

Bismuth Salicylate

Synonym. Bismuth Subsalicylate.

Bismuth Salicylate is a basic salt of varying composition, obtained by the interaction of solutions of bismuth nitrate and sodium salicylate.

Characters. A white or nearly white, amorphous powder; odourless; tasteless. Stable in air.

Insoluble in *water*.

Tests for Identity. Shake 0·1 gramme with 2 millilitres of *dilute sulphuric acid* and 5 millilitres of *ether*, and allow to separate; pour off the ethereal layer, and shake it with 2 millilitres of *water* and 1 drop of *test-solution of ferric chloride*; a deep violet colour is produced.

Yields the *reactions* characteristic of bismuth.

Tests for Purity. Shake 5 grammes with 50 millilitres of *ether* for one minute, and filter; 25 millilitres of the filtrate, on evaporation, yields not more than 0·0025 gramme of salicylic acid.

Ignite 3 grammes, and dissolve the residue in 4 millilitres of *nitric acid*. Evaporate on a water-bath to about half its volume; make up to 100 millilitres with *water*, and filter. Concentrate the filtrate on a water-bath to 30 millilitres, and filter; 5 millilitres of the filtrate comply with the limit tests for lead, and for copper, described under 'Bismuthi Carbonas'.

0·25 gramme, dissolved in 5 millilitres of *nitric acid* and 45 millilitres of *water* and filtered, complies with the *limit test for chlorides*.

To 1 gramme add 4 millilitres of *hydrochloric acid*, and dilute to 20 millilitres with *water*; warm on a water-bath for a few minutes, and cool; filter, and to the filtrate add 0·5 millilitre of *solution of barium chloride*; no turbidity is produced within five minutes (limit of sulphates).

Triturate a mixture of 0·05 gramme and 0·1 gramme of *sodium salicylate* with 5 millilitres of *water*, and superimpose the mixture on 5 millilitres of *sulphuric acid*; no pink or brownish-red colour is produced in the zone of contact (limit of nitrates).

Ignite 2·5 grammes, add a few drops of *nitric acid*, re-ignite, and dissolve the residue in 10 millilitres of *hydrochloric acid*. Add 2 drops of *solution of potassium iodide*; no turbidity or opalescence is produced (absence of silver).

Boil 1 gramme with 20 millilitres of a mixture of equal volumes of *acetic acid* and *water*; cool, filter, wash, and to the filtrate add 2 millilitres of *dilute hydrochloric acid* and 20 millilitres of *water*. Boil the solution, and pass in *hydrogen sulphide* until no further precipitate is produced; filter, and wash the precipitate; evaporate the filtrate and washings to dryness, and ignite the residue gently with 1 drop of *sulphuric acid*; the residue weighs not more than 0·01 gramme (limit of alkalis and alkaline earths).

Arsenic limit, 2 parts per million.

Leaves, on ignition followed by re-ignition at a low red heat with a few drops of *nitric acid*, not less than 62 per cent., and not more than 66 per cent., of residue.

Storage. Bismuth Salicylate should be protected from light.

Sterilisation of a Suspension. A suspension of Bismuth Salicylate for injection is sterilised by *heating in an autoclave*, or by *Tyndallisation.*

Preparation. Injectio Bismuthi Salicylatis.

DOSES

Metric.	**Imperial.**
0·6 to 2 grammes.	**10 to 30 grains.**
By intramuscular injection.	
0·06 to 0·12 gramme.	**1 to 2 grains.**

BISMUTHUM PRÆCIPITATUM

[Bism. Præcip.]

Precipitated Bismuth

Precipitated Bismuth may be obtained by the reduction of a solution of bismuth trichloride in hydrochloric acid by means of hypophosphorous acid. It contains not less than 98·5 per cent. of metallic bismuth.

Characters. A dull grey powder. Easily diffusible in *water*; when mixed with *water* and examined microscopically, no particles with a diameter greater than 15 microns are seen to be present.

Insoluble in *water.*

Tests for Identity. A solution in *nitric acid* yields the *reactions* characteristic of bismuth.

Tests for Purity. *Arsenic limit,* 10 parts per million.

Complies with the other Tests for Purity described under 'Bismuthi Carbonas'.

Assay. Dissolve about 0·2 gramme, accurately weighed, in sufficient *nitric acid* to keep the bismuth in solution, when diluted to about 50 millilitres with *water.* Add *dilute solution of ammonia* drop by drop, until a slight permanent precipitate is formed. Add just sufficient *nitric acid* to redissolve the precipitate, boil, and, while the solution is boiling, add gradually, and slowly at first, 30 millilitres of *solution of ammonium phosphate.* Dilute to about 300 millilitres with boiling water, allow the precipitate to settle, and filter through a Gooch crucible. Wash with hot *water* until the washings are free from phosphate, dry the residue, and ignite. Each gramme of the residue corresponds to 0·6875 gramme of Bi.

Preparation. Injectio Bismuthi.

DOSES

Metric.	**Imperial.**
By intramuscular injection.	
0·1 to 0·2 gramme.	**$1^1/_2$ to 3 grains.**

BORAX

[Borax]

Borax

Synonyms. Borax Purificatus : Purified Borax : Sodium Borate.

$Na_2B_4O_7,10H_2O$ . . . Mol. Wt. 381·4

Borax may be obtained from native borax, or by boiling native calcium borates with sodium carbonate solution. It contains not less than 99 per cent., and not more than the equivalent of 103 per cent., of $Na_2B_4O_7,10H_2O$.

Characters. Transparent, colourless crystals, or a white powder; odourless; taste, saline and alkaline. Effloresces in dry air, and, on ignition, loses all of its water of crystallisation.

Soluble in 25 parts of *water*; insoluble in *alcohol* (*90 per cent.*); soluble in 1 part of *glycerin*.

Tests for Identity. *Turmeric paper*, moistened with a dilute aqueous solution acidified with *hydrochloric acid*, becomes pink or brownish-red on drying, the colour changing to blue or greenish-black on the addition of *dilute solution of ammonia*, or of *solution of sodium hydroxide*.

The mixture, obtained by the addition of *sulphuric acid* and *alcohol* (*95 per cent.*), when ignited, burns with a flame tinged with green.

An aqueous solution is alkaline to *litmus*.

Yields the *reactions* characteristic of sodium.

Tests for Purity. 1 gramme complies with the *limit test for chlorides*, and with the *limit test for sulphates*.

0·5 gramme complies with the *limit test for iron*.

Arsenic limit, 5 parts per million. *Lead limit*, 5 parts per million.

Assay. Dissolve about 1 gramme, accurately weighed, in 30 millilitres of *water*; and neutralise with *N/2 sulphuric acid*, using *methyl orange* as indicator; boil, cool, add 30 millilitres of *glycerin*, and titrate with *N/2 sodium hydroxide*, using *solution of phenolphthalein* as indicator. Each millilitre of *N/2 sodium hydroxide* is equivalent to 0·04768 gramme of $Na_2B_4O_7,10H_2O$.

Preparations. Glycerinum Boracis.
Mel Boracis.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	**5 to 15 grains.**

BUCHU

[Buchu.]

Buchu

Synonyms. Buchu Folia: Buchu Leaves.

Buchu consists of the dried leaves of *Barosma betulina* (Thunb.) Bartl. and Wendl. It contains not more than 5 per cent. of the stems, and not more than 2 per cent. of other organic matter.

Characters. Bright green to yellowish-green, rigid, coriaceous; usually from 12 to 20 millimetres long; rhomboid-obovate; very shortly petiolate; lamina, glabrous or very nearly so, with small scattered prominences; margin, sharply denticulate in the apical half and serrulate in the basal half, with an oil gland at the base of each indentation; apex, blunt and recurved. Epidermal cells of both surfaces, in surface view, polygonal with straight walls; cuticle, thick, with scattered prominences; in the cells, mucilage and yellow sphærocrystalline masses; in the mesophyll, oil glands and idioblasts with clustered crystals of calcium oxalate. Odour and taste, strong and characteristic.

Test for Purity. *Ash*, not more than 5 per cent.

Preparations. Infusum Buchu Concentratum.
Infusum Buchu Recens.

DOSES

Metric.	Imperial.
1 to 2 grammes.	15 to 30 grains.

CAFFEINA

[Caffein.]

Caffeine

$C_8H_{10}O_2N_4,H_2O$ . . . Mol. Wt. 212·1

Caffeine, 1:3:7-trimethylxanthine, is an alkaloid, obtained from the dried leaves of *Camellia sinensis* (Linn.) O. Kuntze, or from certain other plants; or it may be prepared synthetically.

Characters. Colourless, silky needles; odourless; taste, bitter. Efflorescent in dry air.

Soluble in 80 parts of *water*; somewhat more soluble in *alcohol (90 per cent.)*; sparingly soluble in *ether*; readily soluble in *chloroform*.

Tests for Identity. A saturated aqueous solution is neutral to *litmus*.

Dissolve 0·01 gramme in 1 millilitre of *hydrochloric acid*, add 0·1 gramme of *potassium chlorate*, and evaporate to dryness in a porcelain dish; a reddish residue remains, which becomes purple when exposed to the vapour of *dilute solution of ammonia*.

A cold saturated aqueous solution gives with *solution of tannic acid* a white precipitate, which is soluble in excess of the reagent.

A cold saturated aqueous solution gives no precipitate with *N/10 iodine*, but, on the addition of *N/10 hydrochloric acid*, a brown precipitate is formed.

Tests for Purity. *Melting-point* after drying at 100°, 235° to 237°.

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; the solution is colourless; and dissolve 0·1 gramme in 2 millilitres of *nitric acid*; the solution is colourless (limit of readily carbonisable substances).

A cold saturated aqueous solution yields no precipitate with *solution of potassio-mercuric iodide* (limit of other alkaloids).

0·2 gramme loses, when dried at 105°, not more than 0·017 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

DOSES

Metric.	Imperial.
0·12 to 0·3 gramme.	**2 to 5 grains.**

CAFFEINA ET SODII BENZOAS

[Caffein. et Sod. Benz.]

Caffeine and Sodium Benzoate

Caffeine and Sodium Benzoate is a mixture of caffeine with sodium benzoate. It may be prepared by mixing Caffeine with an equal weight of Sodium Benzoate, moistening with either water or alcohol, and drying. It contains not less than 47 per cent., and not more than 50 per cent., of anhydrous caffeine, $C_8H_{10}O_2N_4$, and not less than 50 per cent., and not more than 53 per cent., of sodium benzoate, $C_7H_5O_2Na$, both being calculated with reference to the substance dried at 105°.

Characters. A white powder; odourless; taste, slightly bitter. Soluble in about 1 part of warm *water*, a portion of the caffeine separating when the solution is allowed to cool; completely soluble in 4 parts of *water*; slightly soluble in *alcohol* (*90 per cent.*).

Tests for Identity and Purity. The anhydrous caffeine obtained in the Assay has a *melting-point* of 235° to 237°, and complies with the tests for identity described under 'Caffeina'.

Yields the *reactions* characteristic of sodium.

Evaporate to dryness an ethereal solution, obtained as in the 'Assay for sodium benzoate' described below; the dried residue has a *melting-point* of 121° to 122°, and complies with the tests for identity described under 'Acidum Benzoicum'.

2 grammes, dissolved in 20 millilitres of hot freshly boiled *water*, requires for neutralisation not more than 0·25 millilitre of either *N/10 sodium hydroxide* or *N/10 sulphuric acid*, *solution of phenolphthalein* being used as indicator (limit of acidity, or of alkalinity).

Loses, when dried at 105°, not more than 5 per cent. of its weight.

Assay. *For caffeine.* Dissolve about 1 gramme, accurately weighed, in 50 millilitres of *water*, add 10 millilitres of *N/1 sodium hydroxide*, and extract the alkaloid immediately with successive portions of *chloroform* until, on evaporating 1 millilitre of the chloroform, no residue remains. Wash the mixed chloroform solutions with 2 millilitres of *water*, remove the chloroform, dry the residue at 100°, and weigh the anhydrous caffeine.

For sodium benzoate. Acidify with *dilute sulphuric acid* the mixed aqueous liquid and washings from the preceding assay, extract the liberated benzoic acid with successive quantities of *ether*. Wash the mixed ethereal solutions with *water*, and remove the ether by evaporation. Dissolve the residue in 10 millilitres of warm *alcohol* (*95 per cent.*), add 20 millilitres of *water*, and titrate with *N/10 sodium hydroxide*, using *solution of phenol red* as indicator. Each millilitre of *N/10 sodium hydroxide* is equivalent to 0·0144 gramme of $C_7H_5O_2Na$.

Sterilisation of a Solution. A solution of Caffeine and Sodium Benzoate for injection is sterilised by *heating in an autoclave*, or by *Tyndallisation*, or by *filtration*.

DOSES

Metric.	**Imperial.**
0·3 to 1 gramme.	**5 to 15 grains.**
By injection.	
0·12 to 0·3 gramme.	**2 to 5 grains.**

CALCII CARBONAS

[Calc. Carb.]

Calcium Carbonate

Synonyms. Calcii Carbonas Præcipitatus : Precipitated Calcium Carbonate.

$CaCO_3$ . . . . . Mol. Wt. 100·1

Calcium Carbonate is obtained by the interaction of a soluble calcium salt and a soluble carbonate. It contains not less than 98·5 per cent. of $CaCO_3$, calculated with reference to the substance dried at 100°.

Characters. A white, micro-crystalline powder; odourless; tasteless.

Almost insoluble in *water* ; slightly soluble in *water* containing carbon dioxide.

Tests for Identity. Yields the *reactions* characteristic of calcium, and of carbonates.

Tests for Purity. Dissolve 2 grammes in 5 millilitres of *hydrochloric acid* and 25 millilitres of *water*, boil to remove carbon dioxide, make alkaline with *dilute solution of ammonia*, filter and wash ; the residue, after being dried and gently ignited, weighs not more than 0·01 gramme (limit of aluminium, iron and matter insoluble in hydrochloric acid).

Boil 5 grammes with 100 millilitres of *water* for five minutes, and filter rapidly ; the cooled filtrate requires for neutralisation not more than 2·5 millilitres of *N/10 sulphuric acid*, using *solution of methyl orange* as indicator (limit of soluble alkali).

1 gramme, dissolved in *water* by the addition of 3 millilitres of *nitric acid*, complies with the *limit test for chlorides*.

0·5 gramme, dissolved in *water* by the addition of 3 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates*.

0·2 gramme complies with the *limit test for iron*.

Arsenic limit, 5 parts per million. *Lead limit*, 10 parts per million.

Loses, when dried at 100°, not more than 1 per cent. of its weight.

Assay. Dissolve about 2 grammes, accurately weighed, in 50 millilitres of *N/1 hydrochloric acid* and 100 millilitres of *water*, and titrate the excess of acid with *N/1 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/1 hydrochloric acid* is equivalent to 0·05004 gramme of $CaCO_3$.

DOSES

Metric.	Imperial.
1 to 4 grammes.	15 to 60 grains.

CALCII CHLORIDUM

[Calc. Chlorid.]

Calcium Chloride

$CaCl_2$ . . . . . . Mol. Wt. 111·0

Calcium Chloride may be obtained by neutralising hydrochloric acid with calcium carbonate, evaporating the solution, and drying the product at a temperature not exceeding 200°. It contains not less than 98 per cent. of $CaCl_2$, calculated with reference to the substance dried at 200°.

Characters. Dry, white granules or porous masses; taste, warm and slightly bitter. Very deliquescent.

Soluble in 1·5 parts of *water*, and in 3 parts of *alcohol (90 per cent.)*.

Tests for Identity. Yields the *reactions* characteristic of calcium, and of chlorides.

Tests for Purity. A solution of 2 grammes in 20 millilitres of *water* is not more than slightly turbid, and requires for neutralisation not more than 2·0 millilitres of *N/10 hydrochloric acid, solution of bromothymol blue* being used as indicator (limit of free alkali).

Dissolve 2 grammes in 20 millilitres of *water* and 1 millilitre of *hydrochloric acid*; add a slight excess of *dilute solution of ammonia*, filter, and wash; the residue, after being dried and gently ignited, weighs not more than 0·002 gramme (limit of aluminium, iron, phosphate, and matter insoluble in hydrochloric acid).

2 grammes complies with the *limit test for sulphates*.

Arsenic limit, 5 parts per million. *Lead limit*, 20 parts per million.

Loses, when dried at 200°, not more than 10 per cent. of its weight.

Assay. Dissolve about 5 grammes, accurately weighed, in sufficient *water* to produce 250 millilitres; dilute 10 millilitres of this solution with 50 millilitres of *water*, and titrate with *N/10 silver nitrate*, using *solution of potassium chromate* as indicator. Each millilitre of *N/10 silver nitrate* is equivalent to 0·00555 gramme of $CaCl_2$.

Storage. Calcium Chloride should be kept in a well-closed container.

DOSES

Metric.	Imperial.
0·6 to 2 grammes.	**10 to 30 grains.**
By intramuscular injection.	
0·03 to 0·1 gramme.	**$^1/_2$ to $1^1/_2$ grains.**
By intravenous injection.	
0·3 to 1 gramme.	**5 to 15 grains.**

CALCII HYDROXIDUM

[Calc. Hydrox.]

Calcium Hydroxide

Synonym. Calcii Hydras.

$Ca(OH)_2$ . . . . . Mol. Wt. 74·1

Calcium Hydroxide is obtained by the action of water on lime. It contains not less than 90 per cent. of $Ca(OH)_2$.

Characters. A soft, white powder; taste, alkaline and slightly bitter.

Slightly soluble in *water*; more soluble in solutions of *glycerin*, and of sugars.

Tests for Identity. Yields the *reactions* characteristic of calcium. An aqueous solution is alkaline to *phenolphthalein.*

Tests for Purity. Dissolve 2 grammes in 10 millilitres of *hydrochloric acid* and 20 millilitres of *water*, boil, make alkaline with *dilute solution of ammonia*, and filter; the insoluble residue, after ignition, weighs not more than 0·01 gramme (limit of aluminium, iron, and matter insoluble in hydrochloric acid).

1 gramme, dissolved in *water* by the addition of 4 millilitres of *nitric acid*, complies with the *limit test for chlorides.*

0·5 gramme, dissolved in *water* by the addition of 2·5 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates.*

Arsenic limit, 5 parts per million. *Lead limit*, 20 parts per million.

Assay. Place in a one-litre bottle about 3 grammes, accurately weighed, add 10 millilitres of *alcohol (95 per cent.)*, previously neutralised to *phenolphthalein*; shake gently, and add 490 millilitres of 10 per cent. solution of *sucrose*, previously neutralised to *phenolphthalein.* Shake vigorously for five minutes, and then at frequent intervals during two hours. Filter off 250 millilitres, and titrate with *N/1 hydrochloric acid*, using *solution of phenolphthalein* as indicator. Each millilitre of *N/1 hydrochloric acid* is equivalent to 0·03705 gramme of $Ca(OH)_2$.

Storage. Calcium Hydroxide should be kept in a well-closed container.

Preparation. Liquor Calcii Hydroxidi.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	5 to 15 grains.

CALCII LACTAS

[Calc. Lact.]

Calcium Lactate

$(CH_3 \cdot CHOH \cdot COO)_2Ca,5H_2O$. Mol. Wt. 308·2

Calcium Lactate may be prepared by neutralising diluted lactic acid with calcium carbonate, and evaporating the resulting solution. It contains not less than 97 per cent., and not more than the equivalent of 103 per cent., of $C_6H_{10}O_6Ca,5H_2O$.

Characters. A white powder; odour, slight and not unpleasant; taste, slight.

Very slowly soluble in 18·5 parts of *water*, forming a clear colourless solution; readily soluble in hot *water*.

Tests for Identity. Yields the *reactions* characteristic of calcium.

An aqueous solution, acidified with *sulphuric acid* and warmed with *potassium permanganate*, develops the odour of acetaldehyde.

Tests for Purity. A solution of 5 grammes in hot *water* does not become pink on the addition of a few drops of *solution of phenolphthalein*, and requires not more than 0·5 millilitre of *N/1 sodium hydroxide* to produce a pink colour (limit of alkalinity, or of acidity).

1 gramme, dissolved in 10 millilitres of *water* and boiled with 5 millilitres of *solution of potassio-cupric tartrate*, yields not more than the slightest trace of cuprous oxide (limit of various sugars).

1 gramme, dissolved in *water* by the addition of 2 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates.*

0·5 gramme, dissolved in *water* by the addition of 2 millilitres of *nitric acid*, complies with the *limit test for chlorides.*

0·1 gramme complies with the *limit test for iron.*

Arsenic limit, 5 parts per million. *Lead limit,* 10 parts per million.

Assay. Moisten about 1 gramme, accurately weighed, with *sulphuric acid*, and ignite gently; cool; again moisten with *sulphuric acid*, and ignite gently; weigh the residue. 1 gramme of the residue is equivalent to 2·264 grammes of $C_6H_{10}O_6Ca,5H_2O$.

Storage. Calcium Lactate should be kept in a well-closed container.

DOSES

Metric.	**Imperial.**
1 to 4 grammes.	**15 to 60 grains.**

CALCII PHOSPHAS

[Calc. Phosph.]

Calcium Phosphate

Calcium Phosphate may be prepared by the interaction of calcium chloride and sodium phosphate in the presence of ammonia. It consists of a variable mixture of normal, basic, and acid calcium phosphates. It contains calcium equivalent to not less than 85 per cent. of $Ca_3(PO_4)_2$.

Characters. A white, amorphous powder; odourless; almost tasteless. Stable in air.

Almost insoluble in *water*.

Tests for Identity. Yields the *reactions* characteristic of calcium, and of phosphates.

Tests for Purity. 1 gramme, diffused in 10 millilitres of *water*, dissolves without effervescence on the addition of 5 millilitres of *hydrochloric acid*, leaving not more than a trace undissolved (limit of carbonate, and of matter insoluble in hydrochloric acid).

0·1 gramme, dissolved in *water* by the addition of 1 millilitre of *nitric acid*, complies with the *limit test for chlorides*.

0·15 gramme, dissolved in *water* by the addition of 1 millilitre of *hydrochloric acid*, complies with the *limit test for sulphates*.

0·1 gramme complies with the *limit test for iron*.

Arsenic limit, 5 parts per million. *Lead limit*, 20 parts per million.

Assay. Dissolve about 0·5 gramme, accurately weighed, in 50 millilitres of *water* and 2 millilitres of *hydrochloric acid*, add 25 millilitres of *dilute solution of ammonium acetate* and a slight excess of *solution of ammonium oxalate*; heat on a water-bath for thirty minutes, set aside for some hours, and filter off the precipitate; wash, dry, moisten with *sulphuric acid*, ignite gently, and weigh the residue. 1 gramme of the residue is equivalent to 0·7597 gramme of $Ca_3(PO_4)_2$.

DOSES

Metric.	**Imperial.**
0·6 to 2 grammes.	**10 to 30 grains.**

CALUMBA

[Calumb.]

Calumba

Synonyms. Calumbæ Radix: Calumba Root.

Calumba is the root of *Jateorhiza palmata* (Lamarck)

Miers, cut into oblique or transverse slices, and dried. It contains not more than 2 per cent. of other organic matter.

Characters. Flattish, irregularly circular or oval slices depressed towards the centre, usually from 2 to 6 centimetres in diameter and from 3 to 12 millimetres in thickness. Cork, greyish brown and longitudinally wrinkled; transverse surface, with a dark cambium line, separating the greenish-yellow outer region, traversed by dark sinuous phloem strands, from the greyish inner region, with concentric zones and radiating lines of yellowish xylem vessels; fracture, short. In the outer part of the bark, isolated sclerenchymatous cells with yellow unevenly thickened walls enclosing small prisms of calcium oxalate; vessels of the xylem, large, yellow and reticulate; a 60 per cent. v/v aqueous solution of *sulphuric acid* changes the colour of the sclerenchymatous cells and xylem vessels from yellow to green; starch grains abundant, mostly 20 to 85 microns in length, with a conspicuous, excentric, radiate or cleft hilum. Odour, slight; taste, bitter.

Test for Purity. *Ash*, not more than 9 per cent.

Preparations. Infusum Calumbæ Concentratum.
Infusum Calumbæ Recens.
Tinctura Calumbæ.

DOSES

Metric.	Imperial.
0·6 to 2 grammes.	10 to 30 grains.

CALX CHLORINATA

[Calx Chlorinat.]

Chlorinated Lime

Chlorinated Lime may be obtained by the action of chlorine upon calcium hydroxide. It contains not less than 30 per cent. w/w of available chlorine.

Characters. A dull white powder; odour, characteristic. Becomes moist and gradually decomposes on exposure to air.

Partly soluble in *water*, and in *alcohol* (*90 per cent.*).

Tests for Identity. Evolves chlorine copiously on the addition of *dilute hydrochloric acid*.

Yields the *reactions* characteristic of calcium, and of chlorides.

Assay. Triturate about 4 grammes, accurately weighed, in a mortar with successive small quantities of *water*, and transfer to a litre flask. When all the powder has been transferred to the flask, dilute to 1 litre, and shake thoroughly. Mix 100 millilitres of this suspension with 3 grammes of *potassium iodide*, dissolved in 100 millilitres of *water*; acidify with 5 millilitres of *acetic acid*, and titrate the liberated iodine with *N/10 sodium thiosulphate*. Each millilitre of *N/10 sodium thiosulphate* is equivalent to 0·003546 gramme of available chlorine.

Storage. Chlorinated Lime should be kept in a well-closed container.

Preparation. Liquor Sodæ Chlorinatæ Chirurgicalis.

CAMPHORA

[Camph.]

Camphor

$C_{10}H_{16}O$ . . . . . Mol. Wt. 152·1

Camphor is a white crystalline substance, obtained from *Cinnamomum Camphora* Nees and Eberm., and purified by sublimation (natural camphor); or it may be obtained synthetically from the pinene of oil of turpentine by conversion into camphene and subsequent oxidation (synthetic camphor).

Characters. Colourless, transparent crystals, crystalline masses, blocks of tough consistence, or pulverulent masses, known as 'flowers of camphor'; odour, penetrating and characteristic; taste, pungent, aromatic, and followed by a sensation of cold.

Readily pulverisable in the presence of a little *alcohol (90 per cent.)*, *ether*, or *chloroform*.

Soluble in about 700 parts of *water*, and in 1 part of *alcohol (90 per cent.)*; very soluble in *ether*; soluble in 0·25 part of *chloroform*; freely soluble in fixed vegetable oils.

Specific gravity (15·5°/15·5°), about 0·995.

Tests for Identity. Burns readily with a bright smoky flame, and volatilises even at ordinary temperatures.

Tests for Purity. *Melting-point*, 174° to 177°.

1 gramme forms a clear solution in 10 millilitres of *light petroleum (boiling-point, 50° to 60°)* (limit of water).

Leaves, on volatilisation at 100°, not more than 0·05 per cent. of residue.

Storage. Camphor should be kept in a well-closed container, and stored in a cool place.

Sterilisation of a Solution. A solution of Camphor for injection is sterilised by *heating in an autoclave*, or by *Tyndallisation*. It is necessary to take precautions against loss of camphor by volatilisation.

Preparations. Aqua Camphoræ.
Linimentum Camphoræ.
Linimentum Terebinthinæ Aceticum.
Linimentum Camphoræ Ammoniatum.
Spiritus Camphoræ.
Tinctura Opii Camphorata.

DOSES

Metric.	Imperial.
0·12 to 0·3 gramme.	2 to 5 grains.
By subcutaneous injection.	
0·06 to 0·2 gramme.	1 to 3 grains.

CANTHARIDINUM

[Cantharidin.]

Cantharidin

$C_{10}H_{12}O_4$ . . . . . Mol. Wt. 196·1

Cantharidin may be obtained from various species of *Cantharis*, or of *Mylabris*.

Characters. White, glistening crystals; odourless. Sublimes at about 120°.

Very sparingly soluble in *water*; soluble in about 1100 parts of *alcohol* (*90 per cent.*), in 700 parts of *ether*, in 55 parts of *chloroform*, and in 40 parts of *acetone*; soluble in solutions of *sodium hydroxide* and of *potassium hydroxide*, and in fixed oils.

Tests for Identity and Purity. *Melting-point*, 216° to 218°.

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; the solution is colourless (limit of readily carbonisable substances).

Leaves, on incineration, not more than 0·1 per cent. of residue.

Preparations. Emplastrum Cantharidini.
Liquor Epispasticus.

CAPSICUM

[Capsic.]

Capsicum

Synonym. Capsici Fructus.

Capsicum consists of the dried ripe fruits of *Capsicum minimum* Roxb. It contains not more than 3 per cent.

of calices and pedicels, and not more than 1 per cent. of stalks and other organic matter.

Characters. Dull orange red, oblong conical, obtuse, two-celled fruits, about 12 to 20 millimetres long and up to 7 millimetres in greatest width; sometimes attached to a 5-toothed inferior calyx and a straight slender pedicel, the length of pedicel and calyx being about 2 to 3 centimetres. Pericarp, somewhat shrivelled, glabrous, translucent and leathery, containing about 10 to 20 flat reniform seeds, about 3 to 4 millimetres in length, either loose or attached to a thin reddish dissepiment. The cells of the outer epidermis of the pericarp have straight, evenly and moderately thickened walls, are often arranged in rows of five to seven, and exhibit a cuticle uniformly striated. Odour, characteristic; taste, intensely pungent; the pungency is not affected by caustic alkalis, but is destroyed by *solution of potassium permanganate.*

Test for Purity. *Ash*, not more than 7 per cent.

Preparations. Tinctura Capsici.
Unguentum Capsici.

DOSES

Metric.	Imperial.
0·03 to 0·12 gramme.	1/2 to 2 grains.

CARBONEI DIOXIDUM

[Carbon. Diox.]

Carbon Dioxide

CO_2 . . . . . . Mol. Wt. 44.00

Carbon Dioxide may be obtained from mineral carbonates, or from the fermentation of sugars. It contains not less than 99 per cent. v/v of CO_2. For convenience in use, it may be compressed in metal cylinders.

Characters. A heavy, colourless gas; taste, of an aqueous solution, faintly acid.

One volume of gas dissolves in about 1·3 volumes of *water* at 25°.

Tests for Identity. Extinguishes a flame.

Gives with *solution of barium hydroxide* a white precipitate soluble with effervescence in *acetic acid.*

Tests for Purity. Pass a volume equivalent to 100 millilitres, measured at normal temperature and pressure, through 50 millilitres of *water* to which 2 drops of *solution of methyl orange* has been added; the colour of the liquid is not changed (limit of acid, and of sulphur dioxide).

Pass a volume equivalent to 1000 millilitres, measured at normal temperature and pressure, through *solution of silver ammonio-nitrate*; no turbidity or darkening is produced (limit of phosphine, hydrogen sulphide and organic reducing substances).

Transfer to a suitable container a volume equivalent to 250 millilitres, measured at normal temperature and pressure; add 2·5 millilitres of diluted blood (1 part of blood to 20 parts of *water*), avoiding admixture of air as far as possible. Agitate thoroughly the contents for fifteen minutes. Transfer the blood solution to a small test tube, and add 0·04 gramme of a mixture of equal parts of *pyrogallol* and *tannic acid*. Shake the contents, and set aside for thirty to forty-five minutes; the precipitate assumes a greyish-brown colour (absence of carbon monoxide). If carbon monoxide is present, the precipitate remains red, the intensity of the colour depending on the amount of carbon monoxide in the sample.

Assay. Pass a volume equivalent to 100 millilitres, measured at normal temperature and pressure, into 20 millilitres of a 50 per cent. w/v aqueous solution of *potassium hydroxide* in a suitable gas pipette; at least 99 per cent. v/v is absorbed.

CARBONEI TETRACHLORIDUM

[Carbon. Tetrachlor.]

Carbon Tetrachloride

CCl_4 . . . . . . Mol. Wt. 153·8

Carbon Tetrachloride may be prepared by the action of chlorine on carbon disulphide.

Characters. A clear, colourless, volatile liquid; odour, characteristic; taste, burning. Not inflammable; but in contact with a flame, it decomposes and gives rise to an acrid odour.

Almost insoluble in *water*; miscible with *dehydrated alcohol*, and with *ether*.

Tests for Identity and Purity. The vapour introduced into a Bunsen flame tinges it green.

Specific gravity (15·5°/15·5°), 1·603 to 1·606; *boiling-point*, 76·5° to 77·5°.

Shake 10 millilitres with 10 millilitres of *water* for one minute, and allow to separate; the aqueous layer is neutral to *litmus* (limit of free acid), and shows no opalescence on the addition of 1 millilitre of *solution of silver nitrate* (limit of ionisable chlorides).

Shake 10 millilitres with 5 millilitres of *solution of cadmium iodide* and 1 millilitre of *mucilage of starch*; no blue colour is produced (limit of free chlorine).

Boil for fifteen minutes under a reflux condenser 10 millilitres with 1 millilitre of *dehydrated alcohol* and 3 millilitres of *solution of potassium plumbite*, and set aside for five minutes; the aqueous layer remains colourless (limit of sulphur compounds).

Shake for five minutes 20 millilitres with a cold mixture of 10 millilitres of *sulphuric acid* and 10 millilitres of *N/10 potassium dichromate*, dilute with 100 millilitres of *water*, and add 3 grammes of *potassium iodide*; the liberated iodine requires for decolourisation not less than 9·0 millilitres of *N/10 sodium thiosulphate* (limit of oxidisable impurities).

Leaves, on evaporation on a water-bath, not more than 0·002 per cent. w/v of residue.

Storage. Carbon Tetrachloride should be kept in a well-closed bottle, protected from light.

DOSES

Metric.	Imperial.
2 to 4 mils.	**30 to 60 minims.**

CARBROMALUM

[Carbrom.]

Carbromal

Synonym. Uradal.

$CBr(C_2H_5)_2 \cdot CO \cdot NH \cdot CO \cdot NH_2$. Mol. Wt. 237·0

Carbromal is α-bromo-α-ethylbutyrylcarbamide, and may be prepared by the action of α-bromo-α-ethylbutyryl bromide on urea.

Characters. A white, crystalline powder; almost odourless and tasteless.

Soluble in about 3000 parts of *water*, in 18 parts of *alcohol (95 per cent.)*, in 14 parts of *ether*, and in 3 parts of *chloroform*; slightly soluble in *light petroleum (boiling-point, 50° to 60°)*.

Tests for Identity. Heat 0·2 gramme with about 5 millilitres of *N/1 sodium hydroxide*; ammonia is evolved, and the resulting solution yields the *reactions* characteristic of bromides.

Tests for Purity. *Melting-point,* 116° to 118°.

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; the solution is colourless, or at most faintly brown (limit of readily carbonisable substances).

Shake 1 gramme with 20 millilitres of *water*, and filter; the filtrate complies with the following tests:—

It is neutral to *litmus*.

5 millilitres complies with the *limit test for chlorides*, and with the *limit test for sulphates*.

Leaves, on incineration, not more than 0·05 per cent. of residue.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	5 to 15 grains.

CARDAMOMUM

[Cardam.]

Cardamom

Synonyms. Cardamomi Semina: Cardamom Seeds.

Cardamom consists of the dried ripe, or nearly ripe, seeds of *Elettaria Cardamomum* Maton var. *minuscula* Burkhill. The seeds are separated from the fruits when required for use. It contains not more than 3 per cent. of other organic matter.

Characters. Fruit, up to about 2 centimetres long, ovoid or oblong, pale buff or pale greenish-buff, plump or slightly shrunken, bluntly triangular in section, shortly beaked at the apex, nearly smooth or longitudinally striated, and three-celled, in each cell two rows of seeds in adherent masses. Seed, pale to dark reddish-brown, about 4 millimetres long and 3 millimetres broad, irregularly angular, transversely wrinkled but not minutely pitted, longitudinally channelled, enclosed in a colourless, membranous aril. Epidermal cells, long and narrow; below the epidermis a layer of collapsed parenchymatous cells, followed by a single layer of large, thin-walled, rectangular cells containing volatile oil; within this a single layer of yellowish- to reddish-brown radially elongated sclerenchymatous cells, strongly thickened on the inner and radial walls, each cell containing a small, warty nodule of silica. Cells of the perisperm, thin-walled, packed with minute starch grains, and containing, in a small cavity, up to about 7 small crystals of calcium oxalate; in the endosperm and embryo, protein but no starch. No sclerenchymatous fibres. Odour and taste, strongly aromatic.

Test for Purity. *Ash*, not more than 6 per cent.
Preparation. Tinctura Cardamomi Composita.

DOSES

Metric.	Imperial.
0·6 to 2 grammes.	10 to 30 grains.

CARUM

[Carum]

Caraway

Synonyms. Carui Fructus: Caraway Fruit: Caraway Seed.

Caraway consists of the dried ripe fruits of *Carum Carvi* Linn. It contains not more than 2 per cent. of other organic matter.

Characters. Fruit, elongated. Mericarps, usually separate and free from the pedicel, up to about 7 millimetres long and 2 millimetres broad, almost equally five-sided, narrow, tapering to each end and slightly curved, glabrous, brown, with five very narrow yellow primary ridges. Each mericarp normally with four dorsal vittæ and two commissural vittæ, five vascular strands with small vessels, pitted sclerenchyma and fibres, and an epidermis of thick-walled cells with striated cuticle; lignified and reticulate parenchyma absent. Endosperm, not grooved on the commissure, and consisting of somewhat thick-walled parenchyma, containing fixed oil, aleurone grains up to 10 microns in diameter, and microsphæroidal crystals of calcium oxalate. Odour and taste, aromatic and characteristic.

Tests for Purity. *Ash*, not more than 9 per cent.; *acid-insoluble ash*, not more than 1·5 per cent.

DOSES

Metric.	Imperial.
0·6 to 2 grammes.	10 to 30 grains.

CARYOPHYLLUM

[Caryoph.]

Clove

Synonyms. Cloves: Caryophyllus.

Clove consists of the dried flower-buds of *Eugenia aromatica* (Linn.) Baill. It contains not more than 5 per cent. of its stalks, and not more than 1 per cent. of other organic matter.

Characters. The flower-bud is from 10 to 17·5 millimetres long, bright reddish-brown, and sinks in water; it consists mainly of a sub-cylindrical slightly flattened four-sided hypanthium, which readily exudes oil when indented with the finger-nail, and which contains in its upper portion two loculi with numerous ovules attached to axile placentæ; the hypanthium is surmounted by four thick divergent sepals and four paler unexpanded, membranous, imbricate petals, forming a subspherical head enclosing numerous incurved stamens and a single stiff erect style. The important microscopical features are the schizo-lysigenous glands found in all parts of the clove; the epidermis of the calyx teeth and of the hypanthium, consisting of small, straight-walled cells and possessing stomata; the occasional isolated pericyclic fibres; the tetrahedral pollen grains, 15 to 20 microns in diameter; the fibrous layer of the anther walls; the cluster crystals of calcium oxalate of sizes varying from 6 to 20 microns in diameter; the absence of sclerenchymatous cells, of starch, and of prisms of calcium oxalate. Odour, strong, fragrant and spicy; taste, very pungent and aromatic.

Tests for Purity. *Ash*, not more than 10 per cent.; *acid-insoluble ash*, not more than 0·75 per cent. Pitted sclerenchymatous cells above 70 microns in diameter, few or absent (limit of stalks, 5 per cent.); starch grains, absent (absence of clove fruits, and of cereals).

Preparations. Infusum Caryophylli Concentratum.
Infusum Caryophylli Recens.

DOSES

Metric.	Imperial.
0·12 to 0·3 gramme.	2 to 5 grains.

CASCARA SAGRADA

[Casc. Sagr.]

Cascara Sagrada

Cascara Sagrada is the dried bark of *Rhamnus Purshiana* DC., collected at least one year before being used. It contains not more than 2 per cent. of other organic matter.

Characters. Quilled, channelled or nearly flat pieces from 1 to 4 millimetres thick, varying in length and width, and often as large as 10 or 20 centimetres long and 2 centimetres wide. Outer surface, covered by a nearly smooth cork, dark purplish brown, marked with transversely elongated lenticels, but usually grey to greyish-white from the presence of patches of lichen. Inner surface, reddish-brown to nearly black, with longitudinal striations and faint transverse corrugations. Fracture, short and granular in the outer part; somewhat fibrous in the inner part. Scattered ovoid groups of sclerenchymatous cells in both cortex and phloem; fibres, in groups accompanied by a crystal-sheath with prisms of calcium oxalate; cluster crystals of calcium oxalate scattered throughout the parenchyma, which contains a yellow substance coloured violet by *solution of sodium hydroxide*. Odour, characteristic but not powerful; taste, nauseous, bitter and persistent.

Test for Purity. *Ash*, not more than 6 per cent.

Preparations. Elixir Cascaræ Sagradæ.
Extractum Cascaræ Sagradæ Liquidum.
Extractum Cascaræ Sagradæ Siccum.

DOSES

Metric.	Imperial.
1·2 to 4 grammes.	20 to 60 grains.

CASSIA

[Cass.]

Cassia

Synonyms. Cassiæ Pulpa: Cassia Pulp.

Crush the ripe fruits of *Cassia Fistula* Linn., which are cassia pods of commerce, and dissolve out the pulp by percolation with Distilled Water. Strain the percolate, and evaporate it on the water-bath to the consistence of a soft extract.

DOSES

Metric.	Imperial.
4 to 8 grammes.	60 to 120 grains.

CATAPLASMA KAOLINI

[Cataplasm. Kaolin.]

Poultice of Kaolin

Kaolin, finely sifted, dried at 100°	527	grammes
Boric Acid, finely sifted . .	45	grammes
Methyl Salicylate . . .	2	millilitres
Oil of Peppermint . . .	0·5	millilitre
Thymol	0·5	gramme
Glycerin	425	grammes

Mix the Kaolin and the Boric Acid with the Glycerin; heat the mixture at 120° for one hour, stirring occasionally; allow it to cool. Add the Thymol, previously dissolved in the Methyl Salicylate and the Oil of Peppermint; mix the whole thoroughly.

Storage. Poultice of Kaolin should be kept in a well-closed container.

CATECHU

[Catech.]

Catechu

Synonyms. Pale Catechu: Gambir.

Catechu is a dried aqueous extract, prepared from the leaves and young shoots of *Uncaria gambier* (Hunter) Roxb.

Characters. Cubes, sometimes more or less agglutinated, each edge measuring about twenty-five millimetres, or fragments of cubes. Externally pale greyish-brown to dark reddish-brown, dull. Internally pale brown, porous and friable. When examined under a microscope it is seen to consist chiefly of minute acicular crystals. Odourless; taste, at first bitter and very astringent, but subsequently sweetish.

Tests for Identity. Warm 0·3 gramme with 2 millilitres of *alcohol* (*90 per cent.*), cool, and filter; to the filtrate add 2 millilitres of *solution of sodium hydroxide,* shake, add 2 millilitres of *light petroleum* (*boiling-point, 50° to 60°*), shake again, and allow to separate; the upper layer exhibits a brilliant greenish fluorescence.

Shake 1·0 gramme of powdered catechu with 5 millilitres of warm *chloroform,* and filter; the filtrate is green.

Tests for Purity. A fresh aqueous solution, added to excess of *solution of calcium hydroxide*, may show, after standing for five minutes, a turbidity, but no decided precipitation.

Leaves, when exhausted with *water*, not more than 25 per cent. of insoluble residue, dried at 100°.

Leaves, when exhausted with *alcohol* (*90 per cent.*), not more than 30 per cent. of insoluble residue, dried at 100°; in this residue there is not more than an occasional starch grain.

Loses, when dried at 100°, not more than 10 per cent. of its weight.

Ash, of the powdered drug, not more than 8 per cent.

Preparation. Tinctura Catechu.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	**5 to 15 grains.**

CERA ALBA

[Cera Alb.]

White Beeswax

White Beeswax is Yellow Beeswax, bleached.

Characters. A yellowish-white solid, translucent in thin layers; odour, faint and characteristic.

Tests for Purity. *Acid value*, 18 to 24, when determined by the method described under 'Cera Flava'.

In other respects White Beeswax complies with the tests described under 'Cera Flava'.

CERA FLAVA

[Cera Flav.]

Yellow Beeswax

Yellow Beeswax is obtained from the honeycomb of the bee, *Apis mellifica* Linn., and possibly other species of *Apis*.

Characters. A yellowish-brown solid, somewhat brittle when cold, but becoming plastic when warm; odour, agreeable and honey-like. Fracture, granular, not crystalline.

Insoluble in *water*; sparingly soluble in cold *alcohol* (*90 per cent.*); soluble in warm *ether*, in *chloroform*, and in fixed and volatile oils.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·958 to 0·970; *melting-point*, 62° to 64°; *refractive index* at 80°, 1·4380 to 1·4420; *acid value*, 17 to 23, as determined by titrating about 5 grammes, accurately weighed, dissolved in 20 millilitres of boiling *dehydrated alcohol* previously neutralised to *phenolphthalein*, with *N/2 alcoholic potassium hydroxide*, using *solution of phenolphthalein* as indicator; *ester value*, 70 to 80 as determined by subtracting the *acid value* from the *saponification value*. The *saponification value* is determined by boiling for one and a quarter hours about 5 grammes, accurately weighed, with 25 millilitres of *N/1 potassium hydroxide in dehydrated alcohol*, and titrating, while hot, with *N/1 sulphuric acid*, using *solution of phenolphthalein* as indicator.

The Ratio Number, *ester value* divided by *acid value*, lies between 3·3 and 4·0.

Boil 5 grammes for ten minutes with 80 millilitres of a 10 per cent. w/v aqueous solution of *sodium hydroxide*, replace the water lost by evaporation, cool, filter the solution through glass wool, or asbestos, and acidify with *hydrochloric acid*; the solution does not become turbid (absence of fats, of fatty acids, of Japan wax, and of resin).

Boil about 1 gramme for one hour under a water-cooled reflux condenser with 10 millilitres of *N/2 alcoholic potassium hydroxide*, prepared with *alcohol* (*95 per cent.*), and 10 millilitres of *alcohol* (*95 per cent.*), detach the flask from the condenser, insert a thermometer, and allow to cool, stirring constantly; the liquid does not become cloudy above 61°, but becomes cloudy between 61° and 59°, and precipitation of large flocks occurs at not more than 2 degrees below the point at which the liquid becomes cloudy (absence of ceresin, of paraffin, and of certain other waxes).

CHLORALIS HYDRAS

[Chloral. Hydr.]

Chloral Hydrate

$CCl_3{\cdot}CH(OH)_2$ . . . Mol. Wt. 165·4

Chloral Hydrate may be prepared by the addition of water to chloral, which is produced by the action of dry chlorine on ethyl alcohol. It contains not less than 99 per cent. of $C_2H_3O_2Cl_3$.

Characters. Colourless, non-deliquescent crystals; odour, pungent but not acrid; taste, pungent and rather bitter.

Volatilises slowly on exposure to air.

Soluble in less than 1 part of *water*, of *alcohol* (*90 per cent.*), and of *ether*, and in 3 parts of *chloroform*.

Tests for Identity. Liquefies between 50° and 58°.

An aqueous solution is neutral, or only slightly acid, to *litmus*.

Decomposed by caustic alkalis, liberating chloroform.

Tests for Purity. A solution in *chloroform*, when shaken with *sulphuric acid*, imparts no colour to the acid (absence of certain organic impurities).

Warm 1 gramme with 6 millilitres of *water* and 0·5 millilitre of *solution of sodium hydroxide*, filter, add sufficient *N/10 iodine* to impart a deep brown colour, and set aside for one hour; no yellow crystalline precipitate is produced (absence of chloral alcoholate).

An aqueous solution yields no precipitate with *solution of silver nitrate* (absence of chlorides).

Leaves, on incineration, not more than 0·05 per cent. of residue.

Assay. Dissolve about 4 grammes, accurately weighed, in 10 millilitres of *water*, and add 30 millilitres of *N/1 sodium hydroxide*. Allow the mixture to stand for two minutes, and titrate with *N/1 sulphuric acid*, using *solution of phenolphthalein* as indicator. Each millilitre of *N/1 sodium hydroxide* is equivalent to 0·1654 gramme of $C_2H_3O_2Cl_3$.

DOSES

Metric.	Imperial.
0·3 to 1·2 grammes.	5 to 20 grains.

CHLORAMINA

[Chloram.]

Chloramine

Synonym. Chloramine-T.

$CH_3{\cdot}C_6H_4{\cdot}SO_2Na:NCl,3H_2O$ $[CH_3 : SO_2Na:NCl=1:4]$

Mol. Wt. 281·6

Chloramine is sodium *p*-toluenesulphonchloroamide, and may be prepared by the limited action of solution of sodium hypochlorite upon *p*-toluenesulphonamide. It contains not less than 98 per cent., and not more than the equivalent of 103 per cent., of $C_7H_7O_2NClSNa,3H_2O$.

Characters. White crystals, or a crystalline powder; odour, that of chlorine; taste, unpleasant and bitter. Effloresces and slowly decomposes on exposure to air, losing chlorine and assuming a yellow colour. Decomposed slowly by *alcohol* (*95 per *cent.*). Loses its water of crystallisation at 100°, without decomposition.

Soluble in about 7 parts of *water*, in 2 parts of boiling *water*, and in 12 parts of *alcohol* (*90 per cent.*); insoluble in *ether*, in *chloroform*, and in *benzene*.

Tests for Identity. An aqueous solution is slightly alkaline to *phenolphthalein*; on acidifying it, a white precipitate is produced, which redissolves on the addition of excess of *solution of sodium hydroxide*.

Liberates iodine from *solution of potassium iodide*.

Does not liberate bromine from a solution of *sodium bromide*, until the mixture is acidified (distinction from dichloramine).

On ignition, sudden decomposition occurs, and a residue is left which yields the *reactions* characteristic of sodium, and of sulphates.

Tests for Purity. Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; chlorine is evolved, but not more than a faint yellow colour is produced (limit of readily carbonisable substances).

Mix about 2 grammes with 10 millilitres of *water*, add about 1 gramme of *sodium metabisulphite*, and boil. Cool to 0°, and filter rapidly; wash with three successive quantities of 5 millilitres of ice-cold *water*. Dry the washed precipitate in a vacuum desiccator; the *melting-point* of the dried precipitate is not lower than 134° (limit of ortho compound).

1 gramme, dissolved in 15 millilitres of *dehydrated alcohol* without the aid of heat, leaves not more than 0·015 gramme of insoluble residue (limit of sodium chloride).

Assay. Dissolve in a glass-stoppered bottle about 0·4 gramme, accurately weighed, in 50 millilitres of *water*. Add 10 millilitres of *solution of potassium iodide* and 5 millilitres of *dilute sulphuric acid*. Allow the mixture to stand for ten minutes, and titrate the liberated iodine with *N/10 sodium thiosulphate*. Each millilitre of *N/10 sodium thiosulphate* is equivalent to 0·01408 gramme of $C_7H_7O_2NClSNa,3H_2O$.

Storage. Chloramine should be kept in a well-closed glass container, protected from light, and stored in a cool place.

CHLORBUTOL

[Chlorbutol.]

Chlorbutol

$(CH_3)_2C(CCl_3){\cdot}OH$ . . Mol. Wt. 177·4

Chlorbutol is trichloro-*tert.*-butyl alcohol with a variable amount of water of crystallisation, and may be prepared by heating a mixture of acetone and chloroform with potassium hydroxide.

Characters. Colourless crystals; odour and taste, characteristic, musty, and somewhat camphoraceous. Volatile at ordinary temperatures.

Soluble in 125 parts of *water*, and in 1 part of *alcohol* (*90 per cent.*); readily soluble in *ether*, and in *chloroform*; soluble in 10 parts of *glycerin*, and in volatile oils.

Tests for Identity and Purity. *Melting-point*, not below 78°; when anhydrous, 96°.

To 5 millilitres of a freshly prepared 0·5 per cent. w/v solution in *water* add 1 millilitre of *N/1 sodium hydroxide*, then slowly add 3 millilitres of *N/10 iodine*; the odour of iodoform develops, and a yellow precipitate is produced.

Shake 0·1 gramme with 5 millilitres of *N/1 sodium hydroxide*, add a few drops of *aniline*, and warm; the odour of phenyl isocyanide is produced.

A freshly prepared solution is not acid to *litmus*.

0·5 gramme, dissolved in hot *water*, complies with the *limit test for chlorides*.

Leaves, on incineration, not more than 0·1 per cent. of residue.

Storage. Chlorbutol should be kept in a well-closed container.

DOSES

Metric.	Imperial.
0·3 to 1·2 grammes.	**5 to 20 grains.**

CHLOROFORMUM

[Chlorof.]

Chloroform

$CHCl_3$ . . . . . . Mol. Wt. 119·4

Chloroform is trichloromethane to which 1 to 2 per cent. v/v of Dehydrated Alcohol has been added. Trichloromethane may be prepared by the action of chlorine, in the presence of alkali, on ethyl alcohol, industrial methylated spirit, or acetone.

Characters. A colourless, volatile liquid; odour, characteristic; taste, sweet and burning.

Soluble in about 200 parts of *water*; miscible with *dehydrated alcohol*, with *ether*, with fixed and volatile oils, and with most organic solvents.

Tests for Identity. Not inflammable. The vapour introduced into a Bunsen flame produces a green colour and gives rise to noxious vapours, having a characteristic odour.

1 drop, warmed with 1 drop of *aniline* and 1 millilitre of

solution of sodium hydroxide, produces the characteristic odour of phenyl isocyanide.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·485 to 1·490; *boiling-point,* a small and variable fraction, usually not exceeding 15 per cent. v/v, distils below 60°, and the remainder distils between 60° and 62°.

Allow 10 millilitres to evaporate from a large piece of filter paper placed on a warm plate; no foreign odour is detectable at any stage of the evaporation.

Shake 10 millilitres with 20 millilitres of freshly boiled and cooled *water* for three minutes, and allow separation to take place; the aqueous layer complies with the following tests:—

To 5 millilitres add 0·1 millilitre of neutral *solution of litmus*; the colour produced is not different from that produced on adding 0·1 millilitre of the neutral *solution of litmus* to 5 millilitres of freshly boiled and cooled *water* (limit of acidity).

To 5 millilitres add 5 millilitres of *water* and 0·2 millilitre of *solution of silver nitrate*; no opalescence is produced (limit of chloride).

To 10 millilitres add 1 millilitre of *solution of cadmium iodide* and 2 drops of *mucilage of starch*; no blue colour is produced (limit of free chlorine).

Mix 15 millilitres with 0·02 gramme of *vanillin* and 0·02 gramme of *resorcinol,* and set aside in the dark for one hour; the solution remains perfectly clear and colourless. Add 5 millilitres of a mixture of 1 volume of *dilute solution of ammonia* and 9 volumes of *water,* shake, and allow the liquids to separate; the aqueous liquid shows no immediate pink colour (limit of hydrochloric acid).

Shake 20 millilitres with 10 millilitres of *sulphuric acid* in a stoppered bottle, previously rinsed with *sulphuric acid,* for five minutes, and set aside in the dark for thirty minutes; both the acid and the chloroform remain colourless:—

To 2 millilitres of the acid layer add 5 millilitres of *water*; the liquid remains colourless and clear, and has no unpleasant odour; add a further 10 millilitres of *water* and 0·2 millilitre of *solution of silver nitrate*; no opalescence is produced (absence of foreign organic matter).

Shake 15 millilitres of the chloroform layer with 30 millilitres of *water* in a stoppered bottle for three minutes, and allow separation to take place; to the aqueous layer add 0·2 millilitre of *solution of silver nitrate,* and set aside in the dark for five minutes; no opalescence is produced (absence of foreign chlorine compounds).

Place 20 millilitres in a stoppered bottle with 15 millilitres of *sulphuric acid* and 4 drops of *solution of formaldehyde* and shake frequently during half an hour; set aside for a further half hour, the bottle being protected from light during the test; the acid layer is not more than slightly coloured (limit of decomposition products).

Shake 5 millilitres with 5 millilitres of *water* and 0·2 millilitre of *alkaline solution of potassio-mercuric iodide* in a stoppered bottle, and set aside in the dark for fifteen minutes; not more than a pale yellow colour is produced (limit of aldehyde).

25 millilitres leaves, on evaporation, not more than 0·001 gramme of residue.

Storage. Chloroform should be kept in a well-closed, glass-stoppered bottle, protected from light.

Preparations. Aqua Chloroformi.
Spiritus Chloroformi.

DOSES

Metric.	**Imperial.**
0·06 to 0·3 mil.	**1 to 5 minims.**

CHROMII TRIOXIDUM

[Chrom. Triox.]

Chromium Trioxide

Synonyms. Acidum Chromicum: Chromic Anhydride: Chromic Acid.

CrO_3 . . . . . Mol. Wt. 100·0

Chromium Trioxide may be obtained by the interaction of sulphuric acid and potassium dichromate. It contains not less than 95 per cent. of CrO_3.

Characters. Dark red, acicular crystals, or dark brown masses; odourless. Deliquescent and corrosive.

When strongly heated, it first melts and then evolves oxygen, leaving, after being heated to redness, a greenish residue of chromium sesquioxide, which is insoluble in *water*. In contact with small proportions of *alcohol* (*90 per cent.*), of *ether*, of *glycerin*, and of certain other organic substances, it is liable to cause sudden combustion or explosion.

Very soluble in *water*, and in *ether*.

Tests for Identity. Warmed with *hydrochloric acid*, it evolves chlorine.

A solution, neutralised with *sodium hydroxide*, gives a yellow precipitate on the addition of *solution of lead acetate*.

A dilute solution, acidified with *dilute sulphuric acid*, gives a blue colour on the addition of *solution of hydrogen peroxide*, and, after shaking with *ether*, a blue ethereal layer.

Tests for Purity. Dissolve 2 grammes in 200 millilitres of *water*, add 10 millilitres of *hydrochloric acid* and 5 millilitres of *solution of barium chloride*, and set aside for twenty-four hours; filter off the precipitate, if any, wash with *water*, dry, and ignite; the residue weighs not more than 0·1 gramme (limit of sulphates).

Heat 1 gramme to redness, extract the residue with hot water, filter, and evaporate the filtrate to dryness; the residue weighs not more than 0·02 gramme.

Assay. Dissolve about 1 gramme, accurately weighed, in sufficient *water* to produce 100 millilitres; to 10 millilitres of the solution add 10 millilitres of *dilute sulphuric acid* and 3 grammes of *potassium iodide*; set aside for fifteen minutes, and dilute with *water*; titrate the liberated iodine with *N/10 sodium thiosulphate*, using *mucilage of starch* as indicator. Each millilitre of *N/10 sodium thiosulphate* is equivalent to 0·003334 gramme of CrO_3.

Storage. Chromium Trioxide should be kept in a well-closed, glass-stoppered bottle.

CHRYSAROBINUM

[Chrysarob.]

Chrysarobin

Chrysarobin is a mixture of substances obtained from araroba, a substance found in cavities in the trunk of *Andira araroba* Aguiar, by extracting it with hot benzene, evaporating the solution, and powdering the residue. It consists of chrysophanolanthranol, associated with other substances of analogous composition.

Characters. A light, microcrystalline, yellowish powder; odourless and tasteless. When heated, melts, giving off yellow fumes.

Almost insoluble in *water*; slightly soluble in *alcohol (90 per cent.)*; entirely soluble in hot *chloroform*, and in hot *benzene*.

Tests for Identity. 0·1 gramme, with 10 millilitres of hot *solution of sodium hydroxide*, yields a dark brownish-red solution, 5 drops of which, diluted with 10 millilitres of *water*, shows a green fluorescence.

Shake 0·1 gramme with 5 millilitres of *dilute solution of ammonia*, diluted with 10 millilitres of *water*; the liquid very slowly assumes a pink colour, visible on filtration.

Mix about 1 milligramme on a white tile with a drop of *fuming nitric acid*; a brownish-red liquid is produced; add a drop of *dilute solution of ammonia*; an evanescent violet colour is produced at the surface of contact.

Test for Purity. *Ash*, not more than 0·5 per cent.

Preparation. Unguentum Chrysarobini.

CINCHONA

[Cinchon.]

Cinchona

Synonyms. Cinchonæ Rubræ Cortex: Red Cinchona Bark.

Cinchona is the dried bark of cultivated trees of *Cinchona Calisaya* Weddell, *Cinchona Ledgeriana* Moens, *Cinchona officinalis* Linn., *Cinchona succirubra* Pavon, and of hybrids of either of the last two species with either of the first two. It contains not more than 2 per cent. of other organic matter, and not less than 6 per cent. of the total alkaloids of Cinchona, of which not less than one-half consists of quinine and cinchonidine.

Characters. *Stem bark.* Quilled or curved pieces of very variable size, up to 30 or more centimetres long and usually from 2 to 6 millimetres thick; outer surface, grey or brownish-grey, often bearing lichens and mosses, rough, often with numerous transverse fissures of varying sizes and distinctness, longitudinally furrowed or wrinkled and fissured; inner surface, pale yellowish-brown to deep red-brown, finely to coarsely striated; fracture, short in the outer part, finely fibrous in the inner part. Odour, slight; taste, bitter and astringent.

Root bark. Irregularly channelled, curved or twisted pieces about 2 to 7 centimetres long, often scaly and marked externally with conchoidal depressions, and of the same colour externally as internally; internal surface and other characters, similar to those of the stem bark.

The diagnostic microscopical characters are the large, isolated, spindle-shaped, yellowish phloem fibres, up to 90 microns wide; parenchymatous idioblasts filled with microcrystals of calcium oxalate; thin-walled cork cells and small starch grains, usually from 6 to 10 microns in diameter; only an occasional stone cell is present.

Test for Purity. *Ash*, not more than 4 per cent.

Assay. *For total alkaloids.* Weigh accurately 10 grammes, in about *No. 60 powder*, mix thoroughly with a mixture of 7·5 millilitres of *strong solution of lead subacetate* and 12·5 millilitres of *water*, and set aside for about an hour; add 50 millilitres of *ammoniacal alcohol*, mix well, and set aside for a further hour; transfer to an apparatus for *continuous extraction* with a little more of the *ammoniacal alcohol*, and exhaust, the extraction being continued for about four hours. Remove the greater portion of the alcohol, add 10 millilitres of *N/1 sulphuric acid* and 40 millilitres of *water*, heat to boiling, and cool. Filter the liquid through a tightly packed plug of cotton wool, previously moistened with water, into a separator. Treat the residue in the flask with 15 to 20 millilitres of boiling *N/10 sulphuric acid*, cool, and filter the liquid into the separator. Finally wash the flask and plug of cotton wool with cold *water*, acidified with *dilute sulphuric acid*, until *complete extraction* of the alkaloids is effected. To the contents of the separator add about 20 millilitres of *chloroform*, and shake vigorously and continuously for about one to two minutes; allow the chloroform solution to separate, and run it into a second separator, containing a mixture of 5 millilitres of *N/1 sulphuric acid* and 15 millilitres of *water*; shake well, allow the chloroform to separate, and reject it. Shake the liquid in the first separator with two further quantities of about 20 millilitres of *chloroform*, running each into the second separator, and washing with the same acid liquid as before. Transfer the acid washings, contained in the second separator, to the first separator, add excess of *dilute solution of ammonia*, and shake with successive quantities of *chloroform*, until *complete extraction* is effected. Wash the chloroform solution of the alkaloids with a little *water*, remove the chloroform as completely as possible, add about 5 millilitres of *alcohol* (*95 per cent.*), evaporate, dry at 100°, and weigh.

For quinine and cinchonidine. Dissolve in a flask the total alkaloids, thus obtained, in a mixture of 5 millilitres of *N/1 sulphuric acid*, 10 millilitres of *water* and 10 millilitres of *alcohol* (*95 per cent.*), add 1 millilitre of *solution of hæmatoxylin*, heat to boiling, and add *N/10 sodium hydroxide*, keeping the liquid hot during the addition, until the colour is faintly pink. Cool, add *N/10 sulphuric acid* drop by drop, until the colour just changes to yellow, boil for one or two minutes, cool and, if necessary, again add *N/10 sulphuric acid* until the solution is yellow. Boil, filter through a tightly packed plug of cotton wool into a small tared flask, and wash the first flask and filter with boiling *water*, until *complete extraction* of the alkaloids is effected. Evaporate the filtrate by boiling until it weighs about 50 grammes, add 12·5 grammes of powdered *sodium potassium tartrate*, shake until dissolved, and set aside for twenty-four hours. Filter through a small hardened filter, and wash the flask and filter with 20 millilitres of a 25 per cent. w/v solution of *sodium potassium tartrate* in *water*, using small quantities of the solution at a time. Return the filter to the flask, add 10 millilitres of *solution of sodium hydroxide* and 20 millilitres of *chloroform*, and set aside with frequent shaking, until the alkaloidal tartrates are completely decomposed. Transfer to a separator, and run off the chloroform layer. Extract the flask and liquid in the separator with further portions of *chloroform*, until *complete extraction* of the alkaloids is effected, wash the chloroform solution with a little *water*, remove the chloroform, add 5 millilitres of *alcohol (95 per cent.)*, evaporate, dry at 100°, and weigh the residue, which consists of quinine and cinchonidine.

Preparations. Extractum Cinchonæ.
Extractum Cinchonæ Liquidum.
Tinctura Cinchonæ.
Tinctura Cinchonæ Composita.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	**5 to 15 grains.**

CINCHOPHENUM

[Cinchophen.]

Cinchophen

Synonym. Quinophan.

$C_6H_5 \cdot C_9H_5N \cdot COOH$ . . Mol. Wt. 249·1

Cinchophen, 2-phenylquinoline-4-carboxylic acid, may be prepared by the interaction of pyruvic acid and benzylideneaniline. It contains not less than 99 per cent. of $C_{16}H_{11}O_2N$, calculated with reference to the dried substance.

Characters. White, or yellowish, powder or crystals; almost odourless; taste, slightly bitter.

Insoluble in *water*; soluble in about 120 parts of *alcohol (95 per cent.)*, in about 100 parts of *ether*, in about 400 parts of *chloroform*, and in solutions of alkali hydroxides, carbonates and bicarbonates.

Tests for Identity. A solution, prepared by dissolving 1 gramme in excess of *dilute solution of ammonia*, by evaporating to a small volume, and by diluting with 20 millilitres of *water*, gives a white flocculent precipitate with *solution of silver nitrate*, a yellowish flocculent precipitate with *solution of lead acetate*, and a green flocculent precipitate with *solution of copper sulphate.*

Tests for Purity. *Melting-point,* 214° to 217°.

Dissolve 0·1 gramme in 5 millilitres of *sulphuric acid*; the colour of the solution is not darker than yellow; add 3 drops of *nitric acid*; no reddish or brown colour is produced (limit of readily carbonisable substances).

Mix 0·5 gramme with 10 millilitres of *water,* shake, and filter; the filtrate is neutral to *litmus.*

Loses, when dried in a vacuum desiccator over *sulphuric acid,* not more than 1 per cent. of its weight.

Leaves, on incineration, not more than 0·2 per cent. of residue.

Assay. Dissolve about 0·7 gramme, accurately weighed, in 50 millilitres of warm *alcohol (95 per cent.)*, previously neutralised to *phenolphthalein,* and titrate with *N/10 sodium hydroxide,* using *solution of phenolphthalein* as indicator. Each millilitre of *N/10 sodium hydroxide* is equivalent to 0·02491 gramme of $C_{16}H_{11}O_2N$.

DOSES

Metric.	**Imperial.**
0·3 to 1 gramme.	**5 to 15 grains.**

CINNAMOMUM

[Cinnam.]

Cinnamon

Synonyms. Cinnamomi Cortex: Cinnamon Bark.

Cinnamon is the dried inner bark of the shoots of coppiced trees of *Cinnamomum zeylanicum* Nees, and is known in commerce as Ceylon cinnamon.

Characters. Single or double, closely packed compound quills, up to a metre or more in length, and about 1 centimetre in diameter. Externally, dull yellowish-brown, marked with pale wavy longitudinal lines, and with occasional small scars or holes; inner surface, striated longitudinally. About 0·5 millimetre thick; brittle, fracture splintery; free from all but traces of cork. In the transverse section, near the outer margin, a tangential band of isodiametric or slightly tangentially elongated sclerenchymatous cells, the inner walls of which are often thicker than the outer; some of these cells containing starch grains; medullary rays mostly 2 cells wide; in these cells and in the cells of the parenchyma minute acicular crystals of calcium oxalate; phloem fibres strongly thickened, not more than 30 microns in diameter, isolated or in short rows; in the secondary phloem, axially elongated secretion cells containing volatile oil or mucilage; starch grains, simple or compound; single grains not more than 10 microns in diameter; wood vessels, absent. Odour, fragrant; taste, warm, sweet and aromatic.

Tests for Purity. *Ash*, not more than 7 per cent; *acid-insoluble ash*, not more than 2 per cent.

Preparation. Aqua Cinnamomi Destillata.

DOSES

Metric.	Imperial.
0·3 to 1·2 grammes.	5 to 20 grains.

COCAINA

[Cocain.]

Cocaine

$C_{17}H_{21}O_4N$ . . . . Mol. Wt. 303·2

Cocaine, methylbenzoylecgonine, is an alkaloid, obtained from the leaves of *Erythroxylum Coca* Lam. and other species of *Erythroxylum*, or by synthesis from ecgonine.

Characters. Colourless crystals; odourless; taste, bitter and followed by a sensation of tingling and numbness.

Almost insoluble in *water*; soluble in 10 parts of *alcohol (90 per cent.)*, in 4 parts of *ether*, in 0·5 part of *chloroform*, in 24 parts of *olive oil*, and in about 120 parts of *liquid paraffin*.

A saturated aqueous solution is alkaline to *litmus*.

Tests for Identity. A solution in dilute acids is lævorotatory.

Heat about 0·1 gramme in powder with 1 millilitre of *sulphuric acid* for five minutes at 100°, and cautiously mix it with 2 millilitres of *water*; the aromatic odour of methyl benzoate is perceptible, and, when the solution is cooled and kept for some hours, crystals of benzoic acid separate.

Dissolve 0·05 gramme in 1·65 millilitres of *N/10 hydrochloric acid*, add 8·5 millilitres of *solution of alum* and 5 millilitres of *solution of potassium permanganate*, and stir briskly for several seconds; characteristic rectangular violet plates are formed.

Tests for Purity. *Melting-point*, 97° to 98°.

Dissolve 0·1 gramme, finely powdered, in 2 millilitres of *sulphuric acid*; not more than a slightly yellow tint is produced (limit of readily carbonisable substances).

Dissolve 0·3 gramme, finely powdered, in 1 millilitre of *N/1 hydrochloric acid*, with the aid of heat if necessary, and dilute to 15 millilitres; 5 millilitres complies with the test for limit of reducing substances and of cinnamyl-cocaine, and with the test for absence of isoatropyl-cocaine, described under 'Cocainæ Hydrochloridum'.

0·2 gramme leaves, on incineration, not more than 0·0002 gramme of residue.

DOSES

Metric.	Imperial.
0·008 to 0·016 gramme.	$^1/_8$ to $^1/_4$ grain.

COCAINÆ HYDROCHLORIDUM

[Cocain. Hydrochlor.]

Cocaine Hydrochloride

Synonym. Cocaini hydrochloridum I.A.

$C_{17}H_{21}O_4N,HCl$ . . . Mol. Wt. 339·6

Cocaine Hydrochloride is the hydrochloride of the alkaloid, Cocaine.

Characters. Colourless, transparent crystals; odourless; taste, bitter and followed by a sensation of tingling and numbness.

Soluble in 0·5 part of *water*, and in 3 parts of *alcohol* (*90 per cent.*); insoluble in *olive oil*.

Tests for Identity. To 1 millilitre of a 1 per cent. w/v aqueous solution add 1 or 2 drops of a 3 per cent. w/v aqueous solution of *chromium trioxide*; a yellow precipitate is produced, which dissolves on shaking the solution. On the addition of further drops of the solution of *chromium trioxide*, a permanent precipitate is formed.

Heat about 0·1 gramme in powder with 1 millilitre of *sulphuric acid* for five minutes at 100°, and cautiously mix it with 2 millilitres of *water*; the aromatic odour of methyl benzoate is perceptible, and, when the solution is cooled and kept for some hours, crystals of benzoic acid separate.

Dissolve 0·05 gramme in 1·5 millilitres of *water*, add 8·5 millilitres of *solution of alum* and 5 millilitres of *solution of potassium permanganate*, stir briskly for several seconds; characteristic rectangular violet plates are formed.

A 1 per cent. w/v aqueous solution gives the *reactions* characteristic of chlorides.

Tests for Purity. *Melting-point* the tube being placed in the heating bath at 193°, not below 197°; *specific rotation* in 2 per cent. w/v aqueous solution, − 70° to − 72°.

Dissolve 0·5 gramme in 10 millilitres of *water*, and titrate with *N/50 sodium hydroxide*, using 1 drop of *solution of methyl red* as indicator; not more than 0·5 millilitre is required (limit of acidity).

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

To 5 millilitres of a 2 per cent. w/v aqueous solution add 0·3 millilitre of *N/1 sulphuric acid*, and then 0·5 millilitre of *N/50 potassium permanganate*; a clear violet solution is produced which, in the absence of dust and at a temperature not exceeding 20°, does not completely fade within half an hour (limit of reducing substances, and of cinnamyl-cocaine).

Dissolve 0·1 gramme in 100 millilitres of *water* in a beaker, add, while stirring, 0·25 millilitre of *dilute solution of ammonia*, and set aside the mixture for fifteen minutes, the sides of the beaker being occasionally rubbed with a glass rod; a crystalline deposit separates, leaving the supernatant liquid clear (absence of isoatropyl-cocaine).

0·2 gramme leaves, on incineration, not more than 0·0002 gramme of residue.

Sterilisation of a Solution. A solution of Cocaine Hydrochloride for injection is sterilised by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass*.

Preparations. Lamella Cocainæ.
Oculentum Cocainæ.
Trochiscus Krameriæ et Cocainæ.

DOSES

Metric.	**Imperial.**
0·008 to 0·016 gramme.	**$^1/_8$ to $^1/_4$ grain.**

COCCUS

[Cocc.]

Cochineal

Synonym. Coccus Cacti.

Cochineal is the dried female insect, *Dactylopius coccus* Costa, containing eggs and larvæ. It contains not more than 2 per cent. of other organic matter.

Characters. Colour, purplish-black or purplish-grey; about 3·5 to 5·5 millimetres long and 3 to 4·5 millimetres wide, plano-convex and somewhat oval in outline; the convex dorsal surface is transversely wrinkled, and shows about 11 segments;

the flat or slightly concave ventral surface carries upon the anterior part two 7-jointed, straight antennæ, 3 pairs of short legs each terminating in a single claw, and a mouth from which projects the remains of a long filiform proboscis; these appendages are frequently more or less broken. Scattered irregularly over the whole dermis are numerous solitary and grouped, short, tubular wax glands; within each insect are found numerous larvæ, which are characterised by their proboscides appearing as two circular coils. Easily reduced to powder, which is dark red or puce coloured, and has a characteristic odour.

Tests for Purity. No insoluble powder separates from the whole insect when placed in water.

Ash, not more than 7 per cent.

Preparation. Tinctura Cocci.

CODEINA

[Codein.]

Codeine

$C_{18}H_{21}O_3N,H_2O$ . . . Mol. Wt. 317·2

Codeine, morphine methyl ether, is an alkaloid, obtained from opium, or prepared by the methylation of morphine.

Characters. Colourless, translucent crystals, or a crystalline powder; odourless; taste, bitter.

Soluble in 120 parts of *water*; readily soluble in *alcohol (90 per cent.)*; soluble in 20 parts of *ether*; readily soluble in *chloroform*; soluble in 13 parts of *benzene*.

An aqueous solution is alkaline to *litmus*.

Tests for Identity. A 2 per cent. w/v solution in *water*, acidified with *dilute hydrochloric acid*, yields no precipitate with *dilute solution of ammonia*, but becomes turbid with *solution of sodium hydroxide*, the oily precipitate first formed becoming crystalline on standing (distinction from morphine).

Place a little, in powder, on the surface of a drop of *nitric acid*; a yellow, but not red, colour is produced (distinction from morphine).

Dissolve about 0·1 gramme in 1 millilitre of *sulphuric acid*, add 1 drop of *test-solution of ferric chloride*, or of *solution of ammonium molybdate*, and warm gently; a bluish-violet colour is produced, which is changed to red by a drop of *dilute nitric acid.*

Tests for Purity. *Melting-point* after drying at 100°, 155° to 156°.

Dissolve 0·1 gramme in 2 millilitres of cold *sulphuric acid*; no colour, or at most a faint pinkish tinge, is produced (limit of readily carbonisable substances).

To 5 millilitres of a 2 per cent. w/v solution in *N/10 hydrochloric acid* add 2 millilitres of a 1 per cent. w/v solution of *sodium nitrite* in *water*, and then 3 millilitres of *dilute solution of ammonia*; the yellow colour produced is not deeper than that obtained, when 5 millilitres of a 0·002 per cent. w/v solution of *anhydrous morphine* in *N/10 hydrochloric acid* is similarly treated (limit of morphine).

0·2 gramme loses, when dried at 100°, not more than 0·012 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Codeine should be kept in a well-closed container, protected from light.

DOSES

Metric.	Imperial.
0·016 to 0·06 gramme.	**1/4 to 1 grain.**

CODEINÆ PHOSPHAS

[Codein. Phosph.]

Codeine Phosphate

$C_{18}H_{21}O_3N,H_3PO_4,H_2O$ . . Mol. Wt. 415·2

Codeine Phosphate is the phosphate of the alkaloid, Codeine.

Characters. Colourless, acicular crystals or a crystalline powder; odourless; taste, bitter.

Soluble in 3·5 parts of *water*, and in 350 parts of *alcohol (90 per cent.)*; sparingly soluble in *ether*, and in *chloroform.*

An aqueous solution is acid to *litmus.*

Tests for Identity. Yields the Tests for Identity described under 'Codeina', and the *reactions* characteristic of phosphates.

A 2·5 per cent. w/v solution in *water* yields no precipitate with *dilute solution of ammonia* but becomes turbid with *solution of sodium hydroxide*, the oily precipitate first formed becoming crystalline on standing; *melting-point* of the washed crystals, after drying at 100°, 155° to 156°.

Tests for Purity. To 5 millilitres of a 2 per cent. w/v solution in *N/10 hydrochloric acid* add 2 millilitres of a 1 per cent. w/v solution of *sodium nitrite* in *water*, and then 3 millilitres of *dilute solution of ammonia*; the yellow colour produced is not deeper than that obtained, when 5 millilitres of a 0·002 per cent. w/v solution of *anhydrous morphine* in *N/10 hydrochloric acid* is similarly treated (limit of morphine).

0·5 gramme complies with the *limit test for chlorides*, and with the *limit test for sulphates.*

0·2 gramme loses, when dried at 100°, not less than 0·008 gramme, and not more than 0·014 gramme.

Storage. Codeine Phosphate should be kept in a well-closed container, protected from light.

DOSES

Metric.	**Imperial.**
0·016 to 0·06 gramme.	**$^1/_4$ to 1 grain.**

COLCHICI CORMUS

[Colch. Corm.]

Colchicum Corm

Colchicum Corm is the fresh corm of *Colchicum autumnale* Linn., collected in the early summer; or the same deprived of its coats, sliced transversely, and dried at a temperature not exceeding 65°. It contains not more than 2 per cent. of other organic matter. The dried corm contains not less than 0·25 per cent. of colchicine.

Characters. Fresh corm, about 35 millimetres long and 25 millimetres broad, somewhat conical, on one side rounded, on the other flattened with a small hollow near the base containing a bud; covered with a thin, brown, membranous outer coat, and an inner, reddish-yellow one; internally white, solid, and yielding when cut a whitish turbid juice with a disagreeable odour and a bitter taste. Dried slices, 2 to 5 millimetres thick, sub-reniform or ovate in outline; edges, yellowish; slices, firm and breaking readily with a short mealy fracture; cut surfaces, white and starchy. Starch grains numerous, mostly compound, with 2 to 4, or up to 7 components; single grains also occur; individual grains spherical or ovoid to polyhedral or muller-shaped, 3 to 30 microns in diameter, with a triangular or stellate central hilum. Vessels few, with spiral or annular thickening. The most abundant tissue is large-celled parenchyma; epidermal cells brown, with indistinctly pitted, slightly wavy walls; stomata rare. Sclerenchyma and calcium oxalate crystals absent. Odourless; taste, bitter and acrid.

Assay. Carry out the Assay as directed under 'Colchici Semen'.

To the weighed residue add 10 millilitres of *water*, and allow to stand for a few minutes. Filter through a small filter, and wash the dish and filter with further small quantities of *water*, until *complete extraction* of the alkaloid is effected. Dissolve any insoluble matter on the filter in a little *alcohol* (*95 per cent.*), transfer to the dish containing the remainder of the insoluble matter, evaporate, dry at 100°, and weigh. In order to obtain the weight of colchicine in the colchicum corm being tested, subtract the weight, so obtained, from the weight of the residue, previously determined in the Assay as directed under 'Colchici Semen'.

Preparation. Extractum Colchici Siccum.

DOSES

(of the dried corm)

Metric.	**Imperial.**
0·12 to 0·3 gramme.	**2 to 5 grains.**

COLCHICI SEMEN

[Colch. Sem.]

Colchicum Seed

Colchicum Seed consists of the dried ripe seeds of *Colchicum autumnale* Linn. It contains not more than 2 per cent. of other organic matter, and not less than 0·3 per cent. of colchicine.

Characters. Ovoid or irregularly globular, from 2 to 3 millimetres in diameter, amphitropous with a slight point at the micropyle and an enlarged projecting raphe; externally, dull reddish-brown or occasionally paler, minutely pitted, very hard and tough; seed-coats, with several layers of reddish-brown parenchyma, the outer cells having thick wavy walls, the inner cells having thinner straighter walls; internally, whitish to light brown; endosperm horny, consisting of parenchymatous cells, with very thick pitted walls and containing fixed oil, and aleurone grains; in the raphe, thin-walled parenchyma with ovoid to polyhedral starch grains, 5 to 20 microns in diameter, often with a small stellate hilum. Odourless; taste, bitter and acrid.

Test for Purity. *Ash*, not more than 3 per cent.

Assay. Mix 20 grammes in *coarse powder* with 30 millilitres of *alcohol* (*95 per cent.*), and heat on a water-bath for about fifteen minutes. Transfer to an apparatus for *continuous extraction*, and extract with *alcohol* (*90 per cent.*) for three hours. Cool the extract, set aside for half an hour, and filter, washing the filter with *alcohol* (*90 per cent.*), until *complete extraction* of the alkaloid is effected. Evaporate the filtrate to dryness on a water-bath, wash the residue into a separator with 20 millilitres of a 20 per cent. w/v aqueous solution of *sodium sulphate* and 50 millilitres of *ether*, shake well, allow to separate and run the lower layer into a second separator, containing 50 millilitres of *ether*, again shake well, and separate. Wash the dish with a further 5 millilitres of 20 per cent. w/v aqueous solution of *sodium sulphate*, transfer to the first separator, shake, separate, run into the second separator, shake, and again separate. Repeat the washing of the dish and contents of the two separators in the same manner with a further 5 millilitres of the solution of *sodium sulphate* and then with three portions of 5 millilitres each of *water*. Mix all the aqueous liquids, heat on a water-bath until the ether is completely expelled, cool, add 0·2 gramme of *powdered talc*, and make up to 50 millilitres with the solution of *sodium sulphate*. Set aside for about an hour, shaking frequently, and filter, rejecting the first 5 millilitres of the filtrate. Take 40 millilitres of the filtrate, representing 16 grammes of the colchicum seed being assayed, shake with 40 millilitres of *ether*, separate, and wash the ether with three successive portions of 5 millilitres each of *water*. Mix the aqueous liquids, add 50 millilitres of *chloroform*, and shake; add 2 millilitres of *N/1 sodium hydroxide*, and again shake well. Run off the lower layer into a second separator, containing 2 millilitres of *N/10 sodium hydroxide* and 15 millilitres of *water*, shake, separate, and filter the chloroform solution through a double filter. Continue the extraction with further portions of *chloroform*, washing each portion with the alkaline liquid contained in the second separator, and filtering as before. Remove the chloroform, add 2 millilitres of *alcohol* (*95 per cent.*), evaporate, add a further 2 millilitres of *alcohol* (*95 per cent.*), evaporate, dry at 100°, and weigh the residue which consists of colchicine.

Preparation. Extractum Colchici Liquidum.
Tinctura Colchici.

DOSES

Metric.	**Imperial.**
0·12 to 0·3 gramme.	**2 to 5 grains.**

COLLODIUM FLEXILE

[Collod. Flex.]

Flexible Collodion

Synonym. Collodion.

Pyroxylin	20 grammes
Colophony	30 grammes
Castor Oil	20 grammes
Alcohol (90 per cent.) . .	240 millilitres
Ether, sufficient to produce .	1000 millilitres

Immerse the Pyroxylin in the Alcohol (90 per cent.); add the Colophony and the Castor Oil, and finally sufficient Ether to produce the required volume. Shake occasionally, until dissolved; set aside for any deposit to settle; decant the clear liquid.

Alcohol content, 20 to 23 per cent. v/v of ethyl alcohol.

In making Flexible Collodion the Alcohol (90 per cent.) may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

COLOCYNTHIS

[Colocynth.]

Colocynth

Synonyms. Colocynthidis Pulpa: Colocynth Pulp.

Colocynth is the dried pulp of the fruit of *Citrullus Colocynthis* Schrad. It contains not more than 5 per cent. of the seeds, and not more than 2 per cent. of the outer sclerenchymatous part of the pericarp.

Characters. White, or pale yellowish-white, light, spongy fragments, consisting of parenchymatous tissue composed of large, thin-walled, pitted cells with large intercellular spaces and occasional vascular bundles. It contains no sclerenchymatous cells, starch grains, or crystals of calcium oxalate. Odourless; taste, intensely bitter.

Tests for Purity. *Acid-insoluble ash,* not more than 8 per cent.

Yields, on *continuous extraction* with *light petroleum* (*boiling-point, 50° to 60°*), not more than 3 per cent. of soluble matter, dried at 100°.

Preparations. Extractum Colocynthidis Compositum.
Pilula Colocynthidis et Hyoscyami.

DOSES

Metric.	Imperial.
0·12 to 0·3 gramme.	2 to 5 grains.

COLOPHONIUM

[Coloph.]

Colophony

Synonyms. Resina: Resin.

Colophony is the residue left after distilling the volatile oil from the oleo-resin, obtained from various species of *Pinus*.

Characters. Translucent, pale yellow or brownish-yellow, angular, brittle, glassy masses. Odour and taste, faintly terebinthinate.

Insoluble in *water*; soluble in *alcohol* (*90 per cent.*), in *ether*, in *benzene*, and in *carbon disulphide*; partially soluble in *light petroleum* (*boiling-point, 50° to 60°*). Readily fusible.

Tests for Identity. Dissolve 0·1 gramme in 10 millilitres of *acetic anhydride* by gentle heat, cool, add one drop of *sulphuric acid*; a bright purplish red colour, rapidly changing to violet, is produced.

Shake 0·1 gramme in powder with 10 millilitres of *light petroleum* (*boiling-point, 50° to 60°*), and filter; shake 5 millilitres of the filtrate with 10 millilitres of *dilute solution of copper acetate*; the petroleum solution assumes a bright bluish-green colour.

Tests for Purity. *Acid value*, 150 to 180; *ash*, not more than 0·1 per cent.

Preparation. Emplastrum Colophonii.

CONFECTIO SENNÆ

[Conf. Senn.]

Confection of Senna

Senna Leaf, in *fine powder*	100 grammes
Coriander, in *fine powder*	40 grammes
Figs, of commerce	160 grammes
Tamarind	120 grammes
Cassia	120 grammes
Prunes, of commerce	80 grammes
Extract of Liquorice	15 grammes
Sucrose	400 grammes
Distilled Water	a sufficient quantity.

Boil the figs, Tamarind, and prunes with 350 millilitres of Distilled Water for four hours; add Distilled Water to make up the quantity to its original weight; rub the softened pulp through a hair sieve, rejecting the seeds and other hard parts; with the pulp thus obtained mix the Sucrose, Cassia, and Extract of Liquorice, warming if necessary; while the mixture is still warm, add to it gradually the mixed Senna Leaf and Coriander powders; mix the whole thoroughly. The resulting Confection may be adjusted to a suitable consistence either by evaporation or by the addition of more Distilled Water. The weight of the product shall be not less than 1000 grammes, and not more than 1100 grammes.

DOSES

Metric.	**Imperial.**
4 to 8 grammes.	**60 to 120 grains.**

CONFECTIO SULPHURIS

[Conf. Sulphur.]

Confection of Sulphur

Precipitated Sulphur . . .	450 grammes
Potassium Acid Tartrate, in *fine powder*	110 grammes
Tragacanth, in *fine powder* .	5 grammes
Syrup	210 millilitres
Tincture of Orange . . .	55 millilitres
Glycerin	170 millilitres

Mix the Precipitated Sulphur, Potassium Acid Tartrate, and Tragacanth; add the Syrup, Tincture of Orange, and Glycerin; mix thoroughly.

DOSES

Metric.	**Imperial.**
4 to 8 grammes.	**60 to 120 grains.**

COPAIBA

[Copaib.]

Copaiba

Copaiba is an oleo-resin, obtained by incision from the trunks of various species of *Copaifera* Linn.

Characters. A more or less viscous liquid, generally transparent and occasionally fluorescent, yellow to golden-brown. Odour, aromatic and characteristic; taste, acrid, somewhat bitter and persistent.

Entirely soluble in an equal volume of *dehydrated alcohol*; soluble in an equal volume of *light petroleum* (*boiling-point, 50° to 60°*), the further addition of the solvent producing a flocculent precipitate.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·960 to 0·995; *acid value* calculated with reference to the residue obtained by drying on a water-bath, 120 to 160; *optical rotation* of the volatile oil obtained by distillation in steam or under reduced pressure, – 7° to – 35°.

Add 4 drops of the volatile oil, obtained by distillation in steam or under reduced pressure, to a mixture of 1 drop of *nitric acid* and 3 millilitres of *glacial acetic acid*; no red or purple colour is produced (absence of gurjun balsam).

To 3 millilitres add 1 millilitre of *dilute solution of ammonia*; a clear solution is obtained (absence of fatty oils).

When heated on a water-bath, no odour of turpentine is observed, and, after all the volatile oil has been driven off, a resin remains which, when cold, is hard and brittle.

Yields, when heated on a water-bath until all the volatile oil has been driven off, not less than 50 per cent., and not more than 65 per cent., of residue.

DOSES

Metric.	Imperial.
0·6 to 2 mils.	10 to 30 minims.

CORIANDRUM

[Coriand.]

Coriander

Synonyms. Coriandri Fructus: Coriander Fruit.

Coriander consists of the dried ripe fruits of *Coriandrum sativum* Linn. It contains not more than 2 per cent. of other organic matter.

Characters. Fruit, sub-globular; mericarps, usually remaining united by their margins to form a cremocarp; about 3 millimetres in diameter, uniformly brownish-yellow, glabrous, sometimes crowned by the remains of sepals and styles; primary ridges ten, wavy and inconspicuous; secondary ridges eight, not wavy, and more prominent. Pericarp with normally only two vittæ on the commissural surface of each mericarp, ten mericarpic and two carpophoric vascular strands; outer layers of the pericarp with dorsal vittæ, and epidermis more or less completely thrown off during ripening. Epidermis, when present, with stomata and a few prismatic crystals of calcium oxalate; outer surface usually consisting of elongated parenchymatous cells; in the mesocarp a thick layer of sclerenchyma formed of pitted fusiform cells in sinuous rows and crossing layers. Endosperm, curved, and consisting of somewhat thick-walled parenchyma, containing fixed oil, aleurone grains, and microsphæroidal crystals of calcium oxalate. Odour, aromatic; taste, spicy and characteristic.

Tests for Purity. *Ash,* not more than 7 per cent.; *acid-insoluble ash,* not more than 1 per cent.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	**5 to 15 grains.**

CREOSOTUM

[Creosot.]

Creosote

Synonym. Creasote.

Creosote is obtained by the distillation of wood tar, and consists of a mixture of guaiacol, creosol and other phenols.

Characters. A colourless or pale yellow, highly refractive liquid; odour, penetrating and smoky; taste, burning.

Slightly soluble in *water*; miscible with *alcohol* (*90 per cent.*), with *ether*, and with fixed and volatile oils.

Tests for Identity. To 10 millilitres of a saturated aqueous solution add 1 drop of *solution of ferric chloride*; a very transient violet-blue colour is produced; add a few more drops of *solution of ferric chloride*; the liquid becomes cloudy, and the colour changes rapidly through greyish-green to brown with the formation of a brown precipitate.

Mix with an equal volume of *flexible collodion* in a dry test tube; no permanent coagulum is produced (distinction from phenol, from cresol, and from coal-tar creosote).

Neutral, or only faintly acid, to *litmus* (distinction from coal-tar creosote).

Tests for Purity. *Specific gravity* (15·5°/15·5°), not below 1·070; *boiling-point*, begins to distil at about 200°, and not less than 95 per cent. v/v distils between 200° and 230°.

To 2 millilitres add sufficient *N/1 sodium hydroxide* to produce a clear solution; not less than 10 millilitres, and not more than 18 millilitres, is required; the liquid remains clear on diluting with 50 millilitres of *water* (limit of hydrocarbons, and of bases).

Storage. Creosote should be kept in a well-closed container, protected from light.

DOSES

Metric.	Imperial.
0·12 to 0·6 mil.	2 to 10 minims.

CRESOL

[Cresol.]

Cresol

Cresol is a mixture of cresols and other phenols, obtained from coal-tar.

Characters. An almost colourless to pale brownish-yellow liquid, becoming darker on keeping, or on exposure to light; odour, resembling that of phenol, but more tarry; taste of an aqueous solution, pungent.

Almost completely soluble in 50 parts of *water*; freely soluble in *alcohol* (*90 per cent.*), in *ether*, in *chloroform*, in *glycerin*, and in fixed and volatile oils.

Tests for Identity. Shake 0·5 millilitre with 300 millilitres of *water*, and filter; the filtrate complies with the following tests:—

Add *test-solution of ferric chloride*; a transient bluish colour is produced.

Add *solution of bromine*; a pale yellow flocculent precipitate is produced.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·035 to 1·050; *boiling-point*, not more than 2 per cent. v/v distils below 188°, and not less than 80 per cent. v/v between 195° and 205°.

An aqueous solution is neutral to *litmus*.

Place 50 millilitres in a 500 millilitre round-bottomed flask, add about 83 millilitres of an aqueous solution of *sodium* *hydroxide*, containing 27 per cent. w/w of NaOH [*specific gravity* (15·5°/15·5°), 1·300], and 100 millilitres of *water*, and mix thoroughly. Connect the flask to a splash-bulb and air-condenser about 60 centimetres long, with the end of the air condenser fitting closely into the neck of a 250 millilitre pear-shaped separator and passing well within the separator, which has a cylindrical graduated portion above the stop-cock. Fill the graduated portion of the separator with water. Distil rapidly, until 75 millilitres of distillate have been collected, cooling the separator in running water, if necessary. Allow the separator to stand in a vertical position until separation is complete, and draw off the aqueous liquid into a titration flask. Allow the separator to stand for a short time, measure the volume of hydrocarbon oil in the graduated portion, and warm, if necessary, in order to keep the oil in the liquid state; subtract the volume of volatile bases in the hydrocarbon oil, as determined in the following test; not more than 0·5 per cent. v/v of hydrocarbon oil is present (limit of hydrocarbons).

To the aqueous portion of the distillate, obtained in the preceding test, add any aqueous liquid still remaining in the separator, and neutralise it, if necessary, with *N/10 hydrochloric acid*, using *solution of phenolphthalein* as indicator. Titrate with *N/1 hydrochloric acid*, using *solution of methyl orange* as indicator. Wash the oil from the separator into the titration flask with *water*, and again titrate with *N/1 hydrochloric acid*. From the volume of additional *N/1 hydrochloric acid* calculate the proportion of volatile bases in the hydrocarbon oil. From the total volume of *N/1 hydrochloric acid*, used in both titrations, calculate the proportion of volatile bases in the cresol; each millilitre of *N/1 hydrochloric acid* is equivalent to 0·08 millilitre of volatile bases; not more than 0·1 per cent. v/v of volatile bases, calculated as pyridine, is present (limit of volatile bases).

Place about 20 millilitres in a small conical flask, and over the mouth of the flask fix a piece of filter paper, moistened with a 10 per cent. w/v aqueous solution of *lead acetate*; heat the flask on a water-bath for five minutes; the filter paper shows not more than a light yellow colour (limit of sulphur compounds).

Leaves, when evaporated on a water-bath, not more than 0·1 per cent. w/v of residue.

Storage. Cresol should be kept in a well-closed container, protected from light.

Preparation. Liquor Cresolis Saponatus.

DOSES

Metric.	Imperial.
0·06 to 0·2 mil.	**1 to 3 minims.**

CRETA

[Cret.]

Chalk

Synonyms. Creta Præparata: Prepared Chalk.

$CaCO_3$ . . . . . Mol. Wt. 100·1

Chalk is a native form of calcium carbonate, freed from most of its impurities by elutriation. It contains not less than 97 per cent. of $CaCO_3$, calculated with reference to the substance dried at 100°.

Characters. White, or greyish-white, friable masses or powder; odourless and tasteless.

Almost insoluble in *water*; soluble with effervescence in *hydrochloric acid.*

Tests for Identity. Yields the *reactions* characteristic of calcium, and of carbonates.

Tests for Purity. 1 gramme, boiled with 50 millilitres of *water* and filtered, yields a filtrate which is neutral to *litmus.*

Dissolve 2 grammes in 5 millilitres of *hydrochloric acid* and 25 millilitres of *water*, boil to remove carbon dioxide, make alkaline with *dilute solution of ammonia*, filter, and wash; the residue after ignition weighs not more than 0·04 gramme (limit of aluminium, iron, phosphate and matter insoluble in hydrochloric acid).

1 gramme, dissolved in 2 millilitres of *nitric acid* and 10 millilitres of *water* and filtered, complies with the *limit test for chlorides.*

1 gramme, dissolved in 2·5 millilitres of *hydrochloric acid* and 10 millilitres of *water* and filtered, complies with the *limit test for sulphates.*

Arsenic limit, 5 parts per million. *Lead limit*, 20 parts per million.

Loses, when dried at 100°, not more than 1 per cent. of its weight.

Assay. Dissolve about 2 grammes, accurately weighed, in 50 millilitres of *N/1 hydrochloric acid* and 100 millilitres of *water*, and titrate the excess of acid with *N/1 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/1 hydrochloric acid* is equivalent to 0·05004 gramme of $CaCO_3$.

Preparation. Pulvis Cretæ Aromaticus.
Pulvis Cretæ Aromaticus cum Opio.

DOSES

Metric.	**Imperial.**
1 to 4 grammes.	**15 to 60 grains.**

CUPRI SULPHAS

[Cupr. Sulph.]

Copper Sulphate

$CuSO_4,5H_2O$ . . . . Mol. Wt. 249·7

Copper Sulphate may be obtained by the action of sulphuric acid on copper. It contains not less than 98·5 per cent., and not more than the equivalent of 101 per cent., of $CuSO_4,5H_2O$.

Characters. Blue triclinic prisms, or a blue crystalline powder. Soluble in about 3 parts of *water*; almost insoluble in *alcohol (90 per cent.)*; soluble in about 3 parts of *glycerin.*

Tests for Identity. Yields the *reactions* characteristic of copper, and of sulphates.

Tests for Purity. 1 gramme, dissolved in 20 millilitres of *water*, forms a clear blue solution, neutral to *methyl orange* (limit of acidity).

Dissolve 1 gramme in 10 millilitres of *water*, add 5 millilitres of *dilute solution of ammonia* and sufficient *solution of potassium cyanide* to discharge the blue colour; add 1 drop of *solution of sodium sulphide*; no opalescence, and not more than a slight darkening is produced (limit of zinc, and of lead).

Boil 5 grammes with 25 millilitres of *water* and 2 millilitres of *nitric acid*, cool, and add an excess of *strong solution of ammonia*; filter, and wash the filter with *dilute solution of ammonia*, mixed with four times its volume of *water*. Dissolve the residue, if any, on the filter with 2 millilitres of *hydrochloric acid*, diluted with 10 millilitres of *water*; reprecipitate with *dilute solution of ammonia*, filter, and wash; the residue, after ignition, weighs not more than 0·007 gramme (limit of iron).

Arsenic limit, 10 parts per million.

Assay. Dissolve about 1 gramme, accurately weighed, in 50 millilitres of *water*, add 3 grammes of *potassium iodide* and 5 millilitres of *acetic acid*, and titrate the liberated iodine with *N/10 sodium thiosulphate*, using *mucilage of starch* as indicator. Each millilitre of *N/10 sodium thiosulphate* is equivalent to 0·02497 gramme of $CuSO_4,5H_2O$.

DOSES

Metric.	Imperial.
0·016 to 0·12 gramme.	1/4 to 2 grains.
Emetic Doses	
0·3 to 0·6 gramme.	5 to 10 grains.

DEXTROSUM

[Dextros.]

Dextrose

$C_6H_{12}O_6$ . . . . . Mol. Wt. 180·1

Dextrose may be prepared from starch by hydrolysis.

Characters. A white, crystalline or granular powder; odourless; taste, sweet.

Readily soluble in less than 1 part of *water*; soluble in about 50 parts of cold *alcohol* (*90 per cent.*), and in about 5 parts of boiling *alcohol* (*90 per cent.*).

Tests for Identity and Purity. When heated, it melts, swells up and burns, evolving an odour of burnt sugar.

Warmed with *solution of potassio-cupric tartrate*, it produces a copious precipitate of cuprous oxide.

5 grammes, dissolved in 50 millilitres of freshly boiled and cooled *water*, requires for neutralisation not more than 0·25 millilitre of *N/10 sodium hydroxide*, *solution of phenolphthalein* being used as indicator (limit of acidity).

1 gramme dissolves in 30 millilitres of boiling *alcohol* (*90 per cent.*), forming a clear solution which does not produce any deposit on cooling (limit of less soluble sugars and dextrins).

2 grammes complies with the *limit test for chlorides*.

5 grammes complies with the *limit test for sulphates*.

Specific rotation in a well-boiled 10 per cent. w/v aqueous solution at 20° and calculated with reference to the substance dried at 105°, not less than + 52°.

Arsenic limit, 1 part per million. *Lead limit*, 2 parts per million.

The lead paper used in the *arsenic test* shows no more blackening than that produced in the preparation of a standard stain (limit of sulphite).

Loses, when dried at 105°, not more than 2·5 per cent. of its weight.

Moisten 2 grammes with *sulphuric acid*, ignite gently, again moisten with *sulphuric acid*, and reignite; the residue weighs not more than 0·002 gramme.

Sterilisation of a Solution. A solution of Dextrose for injection is sterilised by *heating in an autoclave*, or by *Tyndallisation*, or by *filtration*.

DIAMORPHINÆ HYDROCHLORIDUM

[Diamorph. Hydrochlor.]

Diamorphine Hydrochloride

$C_{21}H_{23}O_5N,HCl,H_2O$ . . Mol. Wt. 423·7

Diamorphine Hydrochloride, diacetylmorphine hydrochloride, is the hydrochloride of an alkaloid, produced by the acetylation of morphine.

Characters. A colourless, crystalline powder; odourless; taste, bitter.

Soluble in 2 parts of *water*, and in 11 parts of *alcohol* (*90 per cent.*); insoluble in *ether*.

An aqueous solution is faintly acid to *litmus*.

Tests for Identity. Add a small quantity to a few drops of *nitric acid*; a yellow colour is produced, which changes to greenish-blue on warming and reverts to yellow on cooling.

To 0·1 gramme, dissolved in 2 millilitres of *alcohol* (*90 per cent.*), add 1 millilitre of *sulphuric acid*, and warm; an odour of ethyl acetate is produced.

Dissolve 0·1 gramme in 1 millilitre of *sulphuric acid*; a colourless solution is produced, which, when warmed on a water-bath, and then cooled and diluted with 6 millilitres of *water*, gives a deep blue colour on addition of a 0·5 per cent. w/v solution of *potassium ferricyanide* in *water*, containing 1 drop per millilitre of *test-solution of ferric chloride*.

Yields the *reactions* characteristic of chlorides.

Tests for Purity. *Melting-point*, 229° to 233°.

Prepare 5 millilitres of a 0·1 per cent. w/v solution in *N/10 hydrochloric acid*, and immediately add 2 millilitres of a 1 per cent. w/v solution of *sodium nitrite* in *water* and 3 millilitres of *dilute solution of ammonia*; the yellow colour produced is not deeper than that obtained, when 5 millilitres of a 0·0015 per cent. w/v solution of *anhydrous morphine* in *N/10 hydrochloric acid* is similarly treated (limit of morphine).

0·2 gramme loses, when dried at 100°, not more than 0·009 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Diamorphine Hydrochloride should be kept in a well-closed container, protected from light.

Sterilisation of a Solution. A solution of Diamorphine Hydrochloride for injection is sterilised by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass*.

DOSES

Metric.	Imperial.
0·0025 to 0·008 gramme.	$^1/_{24}$ to $^1/_8$ grain.

DIGITALIS FOLIUM

[Digit. Fol.]

Digitalis Leaf

CAUTION.—In any part of the British Empire in which Digitalis Leaf is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Synonym. Digitalis.

Digitalis Leaf is the leaf of *Digitalis purpurea* Linn., rapidly dried at a temperature between 55° and 60° as soon as possible after collection. It contains not more than 2 per cent. of other organic matter.

Characters. Dark greyish-green, brittle; mostly 10 to 30 centimetres long and 4 to 10 centimetres wide, ovate-lanceolate to broadly ovate, petiolate; lamina, with an irregularly crenate or serrate margin, decurrent at the base; apex, subacute; upper surface, hairy; under surface, usually densely pubescent; veinlets, reticulate; hairs, simple, usually 3 to 5 cells long, bluntly pointed and finely warty; also glandular hairs, consisting usually of a unicellular or more rarely uniseriate pedicel bearing a unicellular or bicellular gland. On the upper surface, a varying number of stomata; on the under surface, epidermal cells with wavy walls in surface view and numerous stomata; at the apex of most of the teeth a single large water pore. Calcium oxalate crystals and sclerenchymatous elements absent. Taste, distinctly bitter.

Tests for Purity. Loses, when dried at 100°, not more than 8 per cent. of its weight.

Acid-insoluble ash, not more than 5 per cent.

Storage. Digitalis Leaf should be kept in a container which prevents the access of moisture.

Preparations. Digitalis Pulverata.
Tinctura Digitalis (Method 1).

When Digitalis Folium, Digitalis, Digitalis Folia, or Pulvis Digitalis is prescribed, Digitalis Pulverata shall be dispensed.

DIGITALIS PULVERATA

[Digit. Pulverat.]

Powdered Digitalis

CAUTION.—In any part of the British Empire in which Powdered Digitalis is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Powdered Digitalis is Digitalis Leaf reduced to a *No. 20 powder*, no portion being rejected. This powder must be assayed by the *biological assay of powdered digitalis*, and its strength must be stated in terms of the *international standard digitalis powder* of which 0·1 gramme is taken to have an amount of activity described as 1 Unit.

For therapeutic administration, Powdered Digitalis must be assayed and adjusted to contain 10 Units in 1 gramme. For this purpose Powdered Digitalis, containing more than 10 Units in 1 gramme, may be adjusted to contain 10 Units in 1 gramme by thorough mixture with Powdered Digitalis, containing less than 10 Units in 1 gramme, or with the exhausted marc remaining when Tincture of Digitalis has been prepared, the marc being carefully dried before mixing.

Test for Purity. Loses, when dried at 100°, not more than 8 per cent. of its weight.

Assay. Determine the activity by the *biological assay of powdered digitalis.*

Containers. Each container bears a label stating the number of Units of activity contained in 1 gramme, and the weight in grammes which is equivalent in activity to 1 gramme of the *international standard digitalis powder.*

Storage. Powdered Digitalis must be kept in an air-tight container.

Preparations. Infusum Digitalis Recens.
Tinctura Digitalis (Method 2).

DOSES

Metric.	**Imperial.**
0·03 to 0·1 gramme.	**$^1/_2$ to $1^1/_2$ grains.**
Single Doses	
0·2 to 0·6 gramme.	**3 to 10 grains.**

Powdered Digitalis contains in 0·6 gramme, or in 10 grains, 6 Units of activity.

ELIXIR CASCARÆ SAGRADÆ

[Elix. Casc. Sagr.]

Elixir of Cascara Sagrada

Cascara Sagrada, in *coarse powder*	1000	grammes
Liquorice, unpeeled, in *coarse powder*	125	grammes
Light Magnesium Oxide	150	grammes
Soluble Saccharin	1	gramme
Oil of Coriander	0·15	millilitre
Oil of Anise	0·2	millilitre
Alcohol (90 per cent.)	12·5	millilitres
Glycerin	300	millilitres
Distilled Water, sufficient to produce	1000	millilitres

Mix the Cascara Sagrada, Liquorice and Light Magnesium Oxide, and moisten with 1250 millilitres of boiling Distilled Water, stirring thoroughly. Macerate for twenty-four hours in a well-covered vessel; pack moderately tightly in a percolator, and percolate with boiling Distilled Water until exhausted. Evaporate the percolate on a water-bath, until it measures 650 millilitres. Dissolve the Soluble Saccharin in 12 millilitres of Distilled Water; dissolve the Oil of Coriander and the Oil of Anise in the Alcohol (90 per cent.). Mix both solutions with the Glycerin, add the concentrated percolate and sufficient Distilled Water to produce the required volume, and shake thoroughly. Set aside for not less than twelve hours; filter, if necessary.

DOSES

Metric.	Imperial.
2 to 4 mils.	30 to 60 minims.

EMETINÆ ET BISMUTHI IODIDUM

[Emet. et Bism. Iod.]

Emetine and Bismuth Iodide

Emetine and Bismuth Iodide is a complex iodide of emetine and of bismuth, and may be prepared by precipitation from a solution of emetine hydrochloride by the addition of a solution of potassium bismuth iodide. It contains not less than 25 per cent., and not more than 28 per cent., of emetine, $C_{29}H_{40}O_4N_2$, and not less than 18 per cent., and not more than 21 per cent., of Bi.

Characters. A reddish-orange powder; odourless; taste, bitter and acrid.

Insoluble in *water*, and in *alcohol (95 per cent.)*; soluble in *acetone*; insoluble in dilute acids but undergoing slight decomposition; soluble, with decomposition, in concentrated acids, and in alkaline solutions.

Tests for Identity. Emetine, recovered by the process of Assay for emetine, after conversion into the hydrochloride yields the following reaction:—

Sprinkle a small quantity in powder on the surface of 1 millilitre of *sulphuric acid*, containing 0·005 gramme of *molybdic acid*; a bright green colour is produced.

Yields the *reactions* characteristic of bismuth, and of iodides.

Test for Purity. 0·5 gramme loses, when dried at 100°, not more than 0·01 gramme.

Assay. *For emetine.* Shake for ten minutes about 0·5 gramme, accurately weighed, with 10 millilitres of *dilute hydrochloric acid.* Make alkaline with *dilute solution of ammonia*, and shake with successive quantities of *chloroform* until *complete extraction* of the alkaloid is effected, washing each chloroform solution with the same 5 millilitres of *water*, contained in a second separator. Mix the chloroform solutions, remove the chloroform, dissolve the residue in 10 millilitres of *N/10 sulphuric acid*, and titrate the excess of acid with *N/10 sodium hydroxide*, using *solution of methyl red* as indicator. Each millilitre of *N/10 sulphuric acid* is equivalent to 0·0240 gramme of emetine $C_{29}H_{40}O_4N_2$.

For bismuth. To the residual ammoniacal liquid from the assay for emetine add 30 millilitres of *hydrochloric acid*, and boil for half a minute. Dilute with *water* to 300 millilitres, heat to boiling, and filter, if necessary. Add *dilute solution of ammonia* to the filtrate until a slight turbidity appears, then add *hydrochloric acid* drop by drop until the solution just becomes clear. Heat to boiling, add 50 millilitres of *solution of ammonium phosphate*, and boil for several minutes. Set aside for half an hour, filter, wash with *water*, until the washings are free from chlorides, and ignite the residue. Each gramme of the residue corresponds to 0·6875 gramme of Bi.

Storage. Emetine and Bismuth Iodide should be kept in a well-closed container, protected from light.

DOSES

Metric.	Imperial.
0·06 to 0·2 gramme.	**1 to 3 grains.**

EMETINÆ HYDROCHLORIDUM

[Emet. Hydrochlor.]

Emetine Hydrochloride

$C_{29}H_{40}O_4N_2,2HCl,7H_2O$ . . Mol. Wt. 679·4

Emetine Hydrochloride is the hydrochloride of an alkaloid, emetine, which may be obtained from ipecacuanha root, or be prepared by the methylation of cephæline.

Characters. Colourless, crystalline powder; odourless; taste, bitter. Develops a faintly yellow tint on exposure to light.

Readily soluble in *water*, and in *alcohol* (*90 per cent.*).

An aqueous solution is neutral, or not more than faintly acid, to *litmus*.

Tests for Identity. Sprinkle a small quantity in powder on the surface of 1 millilitre of *sulphuric acid*, containing 0·005 gramme of *molybdic acid*; a bright green colour is produced.

Yields the *reactions* characteristic of chlorides.

Tests for Purity. Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a slightly yellow tint is produced (limit of readily carbonisable substances).

Dissolve 0·2 gramme in 10 millilitres of *water*; add 5 millilitres of *solution of sodium hydroxide*, and shake with *chloroform* in portions of 10 millilitres each, until *complete extraction* of the alkaloid is effected. Discard the chloroform solutions. Acidify the aqueous liquid with *dilute sulphuric acid*, then make alkaline with *dilute solution of ammonia*, and shake with *chloroform* in portions of 10 millilitres each, until *complete extraction* of the alkaloid is effected. Mix the chloroform solutions, remove the chloroform, and dry the residue at 100°. The weight of the residue does not exceed 0·004 gramme (limit of cephæline).

0·2 gramme loses, when dried at 110°, not less than 0·030 gramme, and not more than 0·038 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Emetine Hydrochloride should be kept in a well-closed container, protected from light.

Sterilisation of a Solution. A solution of Emetine Hydrochloride for injection is sterilised by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass*.

DOSES

By injection.

Metric.	Imperial.
0·03 to 0·06 gramme.	$^1/_2$ to 1 grain.

EMPLASTRUM BELLADONNÆ

[Emp. Bellad.]

Plaster of Belladonna

Synonym. Belladonna Plaster.

Exhaust Belladonna Root in *moderately coarse powder* by percolation with a mixture of seven volumes of Alcohol (90 per cent.) and one volume of Distilled Water. Evaporate the percolate to the consistence of a firm extract, and determine the proportion of the alkaloids by the method described under 'Extractum Belladonnæ Siccum'. Mix the resulting extract with Plaster of Colophony, previously melted, in the correct proportions to produce a Plaster of Belladonna, containing approximately 0·25 per cent. of the alkaloids of Belladonna Root.

A spread Plaster of Belladonna of the same alkaloidal strength, made with a suitable rubber basis, may be supplied when a belladonna plaster with rubber basis is prescribed.

In making Plaster of Belladonna the Alcohol (90 per cent.) may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

EMPLASTRUM CANTHARIDINI

[Emp. Cantharidin.]

Plaster of Cantharidin

Synonyms. Cantharidin Plaster : Blistering Plaster.

Plaster of Cantharidin contains approximately 0·2 per cent. of cantharidin.

Cantharidin	2 grammes
Acetone	100 millilitres
Castor Oil	200 grammes
Yellow Beeswax	400 grammes
Wool Fat	398 grammes

Melt the Yellow Beeswax and the Wool Fat together on a water-bath. Dissolve the Cantharidin in the Acetone by the aid of heat, add the Castor Oil, and heat gently until the Acetone has evaporated. Add this solution to the other ingredients, strain, and stir until cold.

EMPLASTRUM COLOPHONII

[Emp. Coloph.]

Plaster of Colophony

Synonyms. Emplastrum Resinæ: Resin Plaster: Adhesive Plaster.

Colophony	100 grammes
Plaster of Lead	850 grammes
Hard Soap	50 grammes

Melt together the Colophony and the Plaster of Lead at as low a temperature as possible, and incorporate the Hard Soap.

EMPLASTRUM PLUMBI

[Emp. Plumb.]

Plaster of Lead

Synonyms. Lead Plaster: Diachylon Plaster: Diachylon.

Lead Monoxide	400 grammes
Olive Oil	800 grammes
Distilled Water	a sufficient quantity

Boil the Lead Monoxide and the Olive Oil with 400 millilitres of Distilled Water in a steam-bath, replacing from time to time water lost by evaporation; stir constantly, until combination is effected. Remove the mass, when cool; knead it thoroughly with hot water; remove excess of water by suitable manipulation.

EPHEDRINÆ HYDROCHLORIDUM

[Ephed. Hydrochlor.]

Ephedrine Hydrochloride

$C_6H_5{\cdot}CH(OH){\cdot}CH(NH{\cdot}CH_3){\cdot}CH_3,HCl$ Mol. Wt. 201·6

Ephedrine Hydrochloride is the hydrochloride of an alkaloid, ephedrine, obtained from *Ephedra sinica* Stapf, *Ephedra equisetina* Bunge, and other species of *Ephedra.*

Characters. Colourless crystals; odourless.

Soluble in *water*, and in *alcohol* (*90 per cent.*).

An aqueous solution is neutral to *litmus.*

Tests for Identity. Dissolve 0·01 gramme in 1 millilitre of *water*, and add 0·1 millilitre of *solution of copper sulphate*, followed by 1 millilitre of *solution of sodium hydroxide*; the liquid becomes violet in colour; add 1 millilitre of *ether*, and shake; the ethereal layer is purple, and the aqueous layer is blue.

Dissolve 0·2 gramme in 5 millilitres of *water*, add 1 millilitre of *solution of sodium hydroxide*; shake with four successive portions of 15 millilitres each of *ether*, and wash the mixed ethereal solutions with 5 millilitres of *water*; allow the ether to evaporate just to dryness on a warm water-bath. Dissolve the residue in 30 millilitres of *chloroform*, cover the dish, and set aside for twelve hours; crystals separate from the liquid, and, after drying, yield the *reactions* characteristic of chlorides.

A 1 per cent. w/v solution in *water* yields the *reactions* characteristic of chlorides.

Tests for Purity. *Melting-point,* 217° to 220°; *specific rotation* in 5 per cent. w/v aqueous solution, from −33° to −36°.

Dissolve 0·2 gramme in 5 millilitres of *water*, add 0·5 millilitre of *dilute hydrochloric acid*, followed by 0·5 millilitre of *solution of barium chloride*, and boil; the liquid shows no opalescence within fifteen minutes (absence of sulphates).

0·2 gramme loses, when dried at 100°, not more than 0·001 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

DOSES

Metric.	Imperial.
0·016 to 0·1 gramme.	**1/4 to 1 1/2 grains.**

ERGOTA

[Ergot.]

Ergot

Synonym. Secale cornutum I.A.

Ergot is the sclerotium of *Claviceps purpurea* Tulasne, arising in the ovary of *Secale cereale* Linn. It contains not more than 2 per cent. of other organic matter, and not less than 0·05 per cent. of the total alkaloids of Ergot, calculated as ergotoxine.

Characters. Dark violet-black, usually from 1·5 to 4 centimetres long and from 2 to 7 millimetres broad, fusiform, obscurely 3 or 4 sided, straight or arcuate; often longitudinally furrowed and transversely cracked; brittle; fracture, short; internally, whitish or pinkish-white, and showing darker lines radiating from the centre. In transverse section, a dark brown outer layer consisting of more or less obliterated cells; within this a pseudo-parenchyma composed of closely compacted very small oval or rounded cells of unequal size with chitinous walls, and containing fixed oil and protein. Odour and taste, characteristic.

Assay. Extract 12 grammes in *No. 60 powder* by percolation with cold *light petroleum* (*boiling-point, 40° to 50°*), until the fat is completely removed. Dry the extracted drug at a temperature not exceeding 40°, transfer to a stoppered flask, add 120 millilitres of *anæsthetic ether*, and set aside for ten minutes. Add 0·5 gramme of *light magnesium oxide* diffused in 20 millilitres of *water*, and shake the mixture at intervals during thirty minutes; add 1·5 grammes of powdered *tragacanth*, shake vigorously, and filter through a plug of cotton wool. Transfer 100 millilitres of the ethereal solution, representing 10 grammes of the ergot being assayed, to a separator, and shake with four successive 10 millilitre portions of a 1 per cent. w/v solution of *tartaric acid* in *water*; separate, and mix the aqueous liquids, transfer to a porcelain dish, remove the dissolved ether by gentle warming in a current of air, and add sufficient *water* to produce 40 millilitres, or other suitable volume. Mix 1 millilitre with 2 millilitres of *solution of dimethylaminobenzaldehyde* and place in warm water until the temperature reaches 45°. Remove from the water-bath and expose to bright light for a period varying from ten minutes to two hours, according to the intensity of the light, until the blue-violet colour which is produced reaches its maximum. In the same manner, mix 1 millilitre of *solution of ergotoxine ethanesulphonate* with 2 millilitres of *solution of dimethylaminobenzaldehyde*, heat to 45° and expose to the same source of light for the same length of time. Determine the ratio of the colour intensities by comparing them in a suitable colorimeter. The colour produced by 1 millilitre of *solution of ergotoxine ethanesulphonate* is equivalent to that produced by 0·0001 gramme of total alkaloids under identical conditions. The acid solution of the alkaloids should be suitably diluted so that the colour, produced during the test, does not differ by more than 20 per cent. from that produced in the *solution of ergotoxine ethanesulphonate.*

Storage. Ergot should be thoroughly dried and kept entire, and stored in a cool place. If Ergot is powdered and stored without immediate removal of the fat, the alkaloidal content decreases.

Preparations. Ergota Præparata.
Extractum Ergotæ Liquidum.

When Ergota, Pulvis Ergotæ, or Powdered Ergot is prescribed, Ergota Præparata shall be dispensed.

ERGOTA PRÆPARATA

[Ergot. Præp.]

Prepared Ergot

Prepared Ergot is Ergot which has been powdered and immediately deprived of its fat. It contains 0·1 per cent. of the total alkaloids of Ergot, calculated as ergotoxine (limits, 0·08 to 0·12).

Percolate Ergot, recently reduced to *moderately fine powder*, with *light petroleum* (*boiling-point, 40° to 50°*), until 1 millilitre of the percolate leaves not more than a barely perceptible film, when evaporated in a glass basin. Dry the powder by exposure to air, completing the drying, if necessary, in a current of air at a temperature not exceeding 40°. Determine the proportion of total alkaloids in the powder by the Assay described below. To the remainder add, if necessary, in order to produce a Prepared Ergot of the required strength, a sufficient quantity either of Ergot in *moderately fine powder* which has been similarly percolated with *light petroleum* (*boiling-point, 40° to 50°*) and contains a larger or smaller proportion of total alkaloids, or of the powder obtained by drying the marc remaining when Liquid Extract of Ergot has been prepared.

Assay. Weigh accurately 12 grammes, and complete the Assay as directed under 'Ergota', commencing with the words 'transfer to a stoppered flask . . .'.

Storage. Prepared Ergot must be kept in an air-tight container.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	5 to 15 grains.

Prepared Ergot contains in 1 gramme 0·001 gramme, and in 15 grains about 1/60 grain, of the total alkaloids of Ergot, calculated as ergotoxine.

ERGOTOXINÆ ÆTHANOSULPHONAS

[Ergotox. Æthanosulph.]

Ergotoxine Ethanesulphonate

Ergotoxine Ethanesulphonate is the ethanesulphonate of an alkaloid, ergotoxine, obtained from Ergot.

Characters. Colourless, acicular crystals; odourless.

Sparingly soluble in *water*; more soluble in *alcohol (90 per cent.)*; easily soluble in *methyl alcohol.*

Tests for Identity. An aqueous solution has a blue fluorescence, and is acid to *litmus*. Decomposes at about 200°.

Dissolve 0·001 gramme in 5 millilitres of *water*; add slowly to 1 millilitre of the solution 2 millilitres of *solution of dimethylaminobenzaldehyde,* cool, and mix; on exposure to light, a deep blue colour is produced.

Dissolve 0·001 gramme in 1 millilitre of *glacial acetic acid,* containing a trace of *ferric chloride,* and add 2 drops of *sulphuric acid*; a purplish blue colour is produced.

Tests for Purity. *Specific rotation* in a solution containing the equivalent of 4 per cent. w/v of the anhydrous salt in a mixture of 2 volumes of *acetone* and 1 volume of *water,* + 112° to + 122°.

To the 4 per cent. w/v solution in *acetone* and *water* add 5 volumes of *water* and 2 volumes of freshly prepared 5 per cent. w/v aqueous solution of *sodium bicarbonate.* Filter quickly by vacuum filtration, wash the precipitate with *water* until free from alkali, and keep for several hours over *potassium hydroxide* in a vacuum desiccator. Determine the residual moisture in a portion of the base by drying at 80° to 90° in a vacuum. Determine the *specific rotation* of the remainder in a 2 per cent. w/v solution in *chloroform*; it is not less than − 180° for the anhydrous base. Extract a portion of the above alkaline filtrate with *ether*, and test the aqueous layer as follows:—

Acidify 5 millilitres with *dilute nitric acid*, and add 0·5 millilitre of *solution of silver nitrate*; no opalescence is produced (limit of chlorides).

Acidify 5 millilitres with *dilute hydrochloric acid*, add 0·5 millilitre of *solution of barium chloride*, and boil; no opalescence is produced within fifteen minutes (limit of sulphates).

0·5 gramme loses, when dried at 90° to 100° in a vacuum, not more than 0·025 gramme.

0·2 gramme leaves, on incineration, not more than 0·0002 gramme of residue.

Dissolve about 1 gramme, accurately weighed, in 5 millilitres of *methyl alcohol* and 1 millilitre of *water*, add 100 millilitres of *water*, and titrate with *N/10 aqueous potassium hydroxide*, using *solution of phenolphthalein* as indicator; not less than 14·5 millilitres, and not more than 15·2 millilitres, is required for neutralisation of 1 gramme of the anhydrous salt. Methods of micro-analysis, if of equivalent accuracy, may be substituted for this determination, if desired.

Storage. Ergotoxine Ethanesulphonate must be kept in an atmosphere of nitrogen in sealed tubes, protected from light.

Solutions of Ergotoxine Ethanesulphonate are liable to deteriorate, and should be kept protected from light, and stored in a cool place.

Sterilisation of a Solution. A solution of Ergotoxine Ethanesulphonate for injection is sterilised by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass*.

DOSES

Metric.	**Imperial.**
By subcutaneous or intramuscular injection.	
0·0005 to 0·001 gramme.	**$^1/_{120}$ to $^1/_{60}$ grain.**

Ergotoxine Ethanesulphonate contains approximately 83·6 per cent. of ergotoxine.

ERYTHRITYLIS TETRANITRAS DILUTUS

[Erythrityl. Tetranit. Dil.]

Diluted Erythrityl Tetranitrate

Synonyms. Erythrityl Tetranitrate (50 per cent.): Erythrol Tetranitrate (50 per cent.).

Diluted Erythrityl Tetranitrate is a mixture of approximately equal weights of erythrityl tetranitrate, $C_4H_6(NO_3)_4$, and Lactose. It contains not less than 47·5 per cent. and not more than 52·5 per cent. of $C_4H_6O_{12}N_4$ (Mol. Wt. 302·1).

Characters. A white powder; odourless; tasteless, except for the slight sweet taste of lactose.

Partially soluble in cold *water*, and in *alcohol* (*90 per cent.*).

Tests for Identity. Shake 0·5 gramme with *water*, filter, and evaporate the filtrate to dryness; the residue responds to the tests for identity described under 'Lactosum'.

Exhaust 0·2 gramme with *dehydrated alcohol*, filter the solution, and evaporate the filtrate to dryness; the residue is crystalline, has a *melting-point* of about 61°, and explodes on percussion. When taking the *melting-point* the operator should be protected by a glass screen.

Assay. Transfer about 0·25 gramme, accurately weighed, to a long-necked flask, add a cold solution of 1 gramme of *salicylic acid* in 30 millilitres of *nitrogen-free sulphuric acid*, mix well, and shake frequently during five to ten minutes. Add 5 grammes of *sodium thiosulphate*, and heat gently for five minutes. Add 1 gramme of *copper sulphate* and 10 grammes of *potassium sulphate*, heat until a clear, pale-blue liquid is obtained, and continue to heat for another two hours. Cool, dilute with *water*, transfer to an ammonia distillation apparatus, add an excess of a 40 per cent. w/v aqueous solution of *sodium hydroxide*, and distil the liberated ammonia into 30 millilitres of *N/10 sulphuric acid*; titrate the excess of acid with *N/10 sodium hydroxide*, using *solution of methyl red* as indicator. Repeat the operation, using 0·125 gramme of *lactose* instead of the diluted erythrityl tetranitrate being tested. The difference between the two titrations represents the acid required to neutralise the ammonia. Each millilitre of *N/10 sulphuric acid* is equivalent to 0·007552 gramme of $C_4H_6O_{12}N_4$.

Storage. Diluted Erythrityl Tetranitrate should be protected from light, and stored in a cool place.

DOSES

Metric.	**Imperial.**
0·03 to 0·12 gramme representing 0·015 to 0·06 gramme of pure Erythrityl Tetranitrate.	**1/2 to 2 grains representing 1/4 to 1 grain of pure Erythrityl Tetranitrate.**

When erythrityl tetranitrate or erythrol tetranitrate is prescribed, twice the prescribed amount of Diluted Erythrityl Tetranitrate must be dispensed.

EUCALYPTOL

[Eucalyp.]

Eucalyptol

Synonym. Cineole.

$C_{10}H_{18}O$ . . . . . Mol. Wt. 154·1

Eucalyptol is the anhydride of 1 : 8-terpin or menthan-1 : 8-diol, and may be obtained from Oil of Eucalyptus. It contains not less than 97·5 per cent. w/w of cineole, $C_{10}H_{18}O$.

Characters. A colourless liquid; odour, characteristic, aromatic and camphoraceous; taste, pungent and cooling.

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), 0·928 to 0·930; *optical rotation,* not greater than + 1° or − 1°; *refractive index* at 20°, 1·456 to 1·460; *freezing-point,* not below 0°.

Soluble in 2 volumes of *alcohol* (*70 per cent.*).

Assay. Carry out the *method for the determination of cineole.*

Storage. Eucalyptol should be kept in a well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	**Imperial.**
0·06 to 0·2 mil.	**1 to 3 minims.**

EXTRACTUM BELLADONNÆ LIQUIDUM

[Ext. Bellad. Liq.]

Liquid Extract of Belladonna

Liquid Extract of Belladonna contains 0·75 per cent. w/v of the alkaloids of Belladonna Root, calculated as hyoscyamine (limits, 0·70 to 0·80).

Belladonna Root, in *moderately coarse powder* . . .	1000 grammes
Alcohol (90 per cent.) Distilled Water	of each a sufficient quantity

Exhaust the Belladonna Root by percolation with a mixture of 7 volumes of Alcohol (90 per cent.) and 1 volume of Distilled Water, reserving the first 400 millilitres. Remove the alcohol from the remainder of the percolate, and evaporate the residue to a soft extract under reduced pressure. Dissolve the extract in the reserved liquid. Determine the proportion of alkaloids in the liquid, thus obtained, by the Assay described below. To the remainder of the liquid add sufficient of the mixture of Alcohol (90 per cent.) and Distilled Water to produce a Liquid Extract of Belladonna of the required strength. Set aside for not less than twelve hours; filter, if necessary.

Assay. Introduce 10 millilitres into a separator, containing 10 millilitres of *water*, 10 millilitres of *N/5 sulphuric acid* and 10 millilitres of *chloroform*. Shake well, allow to separate, and remove the chloroform to another separator; repeat the extraction with further quantities each of 10 millilitres of *chloroform*, until no more colour is removed. Wash the mixed chloroform solutions with 10 millilitres of *N/5 sulphuric acid*, and add the acid solution to the first acid aqueous liquid. Complete the Assay as directed under 'Belladonnæ Folium', commencing with the words, 'make distinctly alkaline with *dilute solution of ammonia* . . .'.

Alcohol content, 63 to 73 per cent. v/v of ethyl alcohol.

Preparation. Suppositorium Belladonnæ.

DOSES

Metric.	**Imperial.**
0·015 to 0·06 mil.	**1/4 to 1 minim.**

Liquid Extract of Belladonna contains in 0·06 mil 0·00045 gramme, and in 1 minim about 1/150 grain, of the alkaloids of Belladonna Root, calculated as hyoscyamine.

EXTRACTUM BELLADONNÆ SICCUM

[Ext. Bellad. Sicc.]

Dry Extract of Belladonna

Dry Extract of Belladonna contains 1 per cent. of the alkaloids of Belladonna Leaf, calculated as hyoscyamine (limits, 0·95 to 1·05).

Belladonna Leaf, in *moderately coarse powder*	1000 grammes
Belladonna Leaf, in *fine powder*, dried at 80° . . .	of each a sufficient quantity
Alcohol (70 per cent.) . .	

Percolate the Belladonna Leaf, in *moderately coarse powder*, with Alcohol (70 per cent.), until 4000 millilitres of percolate have been obtained. Determine the proportion of total solids in the percolate by evaporating 20 millilitres, drying the residue at 80°, and weighing. Determine also the proportion of alkaloids in the percolate by the Assay described under 'Tinctura Belladonnæ', using 50 millilitres.

Having thus determined the proportion of total solids and of alkaloids in the percolate, calculate the amount of each that the remainder of the percolate will yield. Determine the proportion of alkaloids present in the Belladonna Leaf, in *fine powder*, by the Assay described under 'Belladonnæ Folium'. Calculate the amount of Belladonna Leaf, in *fine powder*, that must be added to the percolate to produce a dry extract containing 1 per cent. of alkaloids. Add to the percolate a somewhat smaller amount of Belladonna Leaf, in *fine powder*, than calculation has shown to be necessary; remove the alcohol, evaporate to dryness under reduced pressure at [illegible] temperature not exceeding 60°, and dry finally in a current of air at 80°. Powder the residue, add the final necessary amount of Belladonna Leaf, in *fine powder*, and triturate in a dry, slightly warmed mortar until thoroughly mixed. Pass the powdered Extract through a *No. 22 sieve.*

In making Dry Extract of Belladonna the Alcohol (70 per cent.) may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

Assay. Weigh accurately about 3 grammes, and wash it into a separator with 12 millilitres of a mixture of equal volumes of *alcohol* (*95 per cent.*) and *water.* Shake well and frequently during about thirty minutes. Add 2 millilitres of *dilute solution of ammonia* and 25 millilitres of *chloroform*, and shake well. Run the chloroform layer into a second separator through a tightly packed plug of cotton wool, previously moistened with *chloroform.* Repeat the extraction with further portions of 25 millilitres each of *chloroform*, usually about four times in all, until *complete extraction* of the alkaloids is effected, running each chloroform solution through the plug of cotton wool, as before. Shake the chloroform solution with successive portions of a mixture of 3 volumes of *N/5 sulphuric acid* and 1 volume of *alcohol* (*95 per cent.*), until *complete extraction* is effected. Complete the Assay as directed under 'Belladonnæ Folium' commencing with the words 'Wash the mixed acid solutions . . . '.

Storage. Dry Extract of Belladonna should be kept in a small, wide-mouthed, well-closed container, and stored in a cool place.

DOSES

Metric.	**Imperial.**
0·015 to 0·06 gramme.	**$^1/_4$ to 1 grain.**

Dry Extract of Belladonna contains in 0·06 gramme 0·0006 gramme, and in 1 grain about $^1/_{100}$ grain, of the alkaloids of Belladonna Leaf, calculated as hyoscyamine.

EXTRACTUM CASCARÆ SAGRADÆ LIQUIDUM

[Ext. Casc. Sagr. Liq.]

Liquid Extract of Cascara Sagrada

Synonym. Fluid Extract of Cascara Sagrada.

Cascara Sagrada, in *coarse powder*	1000 grammes
Alcohol (90 per cent.) . .	250 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Exhaust the Cascara Sagrada with Distilled Water by percolation ; evaporate the percolate to 600 millilitres ; add the Alcohol (90 per cent.), previously mixed with 150 millilitres of Distilled Water and, if necessary, add a further quantity of Distilled Water to produce the required volume. Set aside for not less than forty-eight hours, and filter.

Alcohol content, 21 to 24 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

EXTRACTUM CASCARÆ SAGRADÆ SICCUM

[Ext. Casc. Sagr. Sicc.]

Dry Extract of Cascara Sagrada

Exhaust Cascara Sagrada, in *coarse powder*, with Distilled Water by percolation; evaporate the percolate to dryness under reduced pressure. Granulate the product by passing through a *No. 22 sieve.*

Storage. Dry Extract of Cascara Sagrada should be kept in a small, wide-mouthed, well-closed container, and stored in a cool place.

DOSES

Metric.	**Imperial.**
0·12 to 0·5 gramme.	**2 to 8 grains.**

EXTRACTUM CINCHONÆ

[Ext. Cinchon.]

Extract of Cinchona

Extract of Cinchona contains 10 per cent. of the alkaloids of Cinchona (limits, 9·5 to 10·5).

Cinchona, in *moderately fine powder*	1000 grammes
Glycerin	of each a sufficient quantity
Alcohol (90 per cent.)	of each a sufficient quantity

Percolate the Cinchona with Alcohol (90 per cent.) until the residue, obtained by evaporating 5 millilitres of the percolate, when dissolved in *dilute sulphuric acid*, gives not more than an opalescence with *solution of potassio-mercuric iodide.* Remove the alcohol from the percolate, add 100 millilitres of Glycerin, and evaporate to the consistence of a soft extract. Determine the proportion of alkaloids in the extract by the Assay described below, and either evaporate the remainder of the extract, or dilute it with a sufficient quantity of Glycerin, so as to produce an Extract of Cinchona of the required strength.

In making Extract of Cinchona the Alcohol (90 per cent.) may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

Assay. Take about 2 grammes, accurately weighed, and wash it into a separator with 10 millilitres of a mixture of equal volumes of *alcohol* (*95 per cent.*) and *water*. Add 1 millilitre of *N/1 hydrochloric acid* and 20 millilitres of *chloroform*, and shake vigorously for about two minutes; run the chloroform layer into a second separator containing 5 millilitres of *N/1 sulphuric acid*, shake well, allow to separate, and reject the chloroform. Continue the extraction of the liquid in the first separator with two further quantities of *chloroform*, transferring them to the second separator, and washing with the same acid liquid as before. To the contents of each separator add 2·5 millilitres of *solution of sodium hydroxide*, and mix well. Shake the contents of the first separator with 20 millilitres of *chloroform* for about two minutes, transfer the chloroform layer to the second separator, shake, and separate the chloroform solution of alkaloids. Continue the extraction of the liquid in the first separator with further quantities of 20 millilitres of *chloroform*, until *complete extraction* of the alkaloids is effected, transferring the chloroform layer each time to the second separator, shaking and separating. Wash the mixed chloroform solutions with a little *water*, remove the chloroform, add 5 millilitres of *alcohol* (*95 per cent.*), evaporate, dry at 100°, and weigh.

Storage. Extract of Cinchona should be kept in a small, wide-mouthed, well-closed container, and stored in a cool place.

Preparations. Extractum Cinchonæ Liquidum.
Tinctura Cinchonæ.
Tinctura Cinchonæ Composita.

DOSES

Metric.	Imperial.
0·12 to 0·5 gramme.	**2 to 8 grains.**

Extract of Cinchona contains in 0·5 gramme 0·05 gramme, and in 8 grains about 4/5 grain, of the alkaloids of Cinchona.

EXTRACTUM CINCHONÆ LIQUIDUM

[Ext. Cinchon. Liq.]

Liquid Extract of Cinchona

Liquid Extract of Cinchona contains 5 per cent. w/v of the alkaloids of Cinchona (limits, 4·75 to 5·25).

Extract of Cinchona . . .	500 grammes
Hydrochloric Acid . . .	30 millilitres
Glycerin	100 millilitres
Alcohol (90 per cent.) . .	250 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Mix the Extract of Cinchona with the Alcohol (90 per cent.) and 250 millilitres of Distilled Water; add the Glycerin, the Hydrochloric Acid and a sufficient quantity of Distilled Water to produce the required volume; set aside for not less than twenty-four hours, and filter.

Assay. Weigh accurately about 5 millilitres, and carry out the Assay as directed under 'Extractum Cinchonæ'. Determine the *specific gravity*, and calculate the proportion of alkaloids weight in volume.

Alcohol content, 21 to 24 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
0·3 to 1 mil.	5 to 15 minims.

Liquid Extract of Cinchona contains in 1 mil 0·05 gramme, and in 15 minims about $^3/_4$ grain, of the alkaloids of Cinchona.

EXTRACTUM COLCHICI LIQUIDUM

[Ext. Colch. Liq.]

Liquid Extract of Colchicum

Synonym. Fluidextractum Colchici.

Liquid Extract of Colchicum contains 0·3 per cent. w/v of colchicine (limits, 0·27 to 0·33).

Colchicum Seed, in *moderately coarse powder* . . .	1000 grammes
Alcohol (60 per cent.) .	a sufficient quantity

Pack the Colchicum Seed in a percolator, add sufficient *light petroleum* (*boiling-point, 50° to 60°*) to saturate the drug and to form a layer above it. When the liquid begins to drip from the percolator close the outlet, and macerate for twenty-four hours; then allow percolation to proceed, continuing the addition of *light petroleum* (*boiling-point, 50° to 60°*), until 1 millilitre of the percolate leaves not more than a barely perceptible film, when evaporated in a glass basin. Remove the marc from the percolator, and dry it by exposing it to the air, gradually heating it, if necessary, to a temperature not exceeding 50°. Again reduce it to powder, repack in the percolator, and moisten with Alcohol (60 per cent.); macerate for forty-eight hours, then pour on successive quantities of Alcohol (60 per cent.), percolating slowly until 1000 millilitres of the percolate are obtained. Determine the proportion of colchicine in the percolate by the Assay described below. To the remainder of the percolate add a sufficient quantity of Alcohol (60 per cent.) to produce a Liquid Extract of Colchicum of the required strength; set aside for not less than twenty-four hours, and filter.

Assay. Evaporate 20 millilitres to dryness on a water-bath, and complete the Assay as directed under 'Colchici Semen', commencing with the words 'wash the residue into a separator with 20 millilitres of a 20 per cent. w/v aqueous solution of *sodium sulphate* . . .'. 40 millilitres of the filtrate represents 16 millilitres of the liquid extract of colchicum being assayed.

Alcohol content, 50 to 60 per cent. v/v of ethyl alcohol.

Preparation. Tinctura Colchici.

DOSES

Metric.	**Imperial.**
0·12 to 0·3 mil.	**2 to 5 minims.**

Liquid Extract of Colchicum contains in 0·3 mil 0·0009 gramme, and in 5 minims about $^1/_{70}$ grain, of colchicine.

EXTRACTUM COLCHICI SICCUM

[Ext. Colch. Sicc.]

Dry Extract of Colchicum

Synonyms. Extractum Colchici: Extract of Colchicum.

Dry Extract of Colchicum contains 1 per cent. of colchicine (limits, 0·9 to 1·1):

Colchicum Corm, in *moderately fine powder*	1000 grammes
Alcohol (60 per cent.) .	of each a sufficient quantity
Lactose	

Exhaust the Colchicum Corm by percolation with Alcohol (60 per cent.). Remove the alcohol, and evaporate the residue, under reduced pressure at a temperature not exceeding 60°, to a thin syrupy liquid. Determine the proportion of total solids in the syrupy liquid by evaporating 2 grammes, drying the residue at 100°, and weighing. Determine also the proportion of colchicine in the syrupy liquid by the Assay described below, commencing with the words 'wash the residue into a separator . . .'. To the remainder of the syrupy liquid add the calculated amount of Lactose, required to produce a Dry Extract of Colchicum of the required strength. Evaporate to dryness, dry the residue at 100°, triturate until reduced to powder, and pass the powdered extract through a *No. 22 sieve.*

In making Dry Extract of Colchicum, the Alcohol (60 per cent.) may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

Assay. Carry out the Assay as directed under 'Colchici Cormus', using 5 grammes, accurately weighed. 40 millilitres of the filtrate represents 4 grammes of the dry extract of colchicum being assayed.

Storage. Dry Extract of Colchicum should be kept in a small, wide-mouthed, well-closed container, and stored in a cool place.

DOSES

Metric.	Imperial.
0·015 to 0·06 gramme.	1/4 to 1 grain.

Dry Extract of Colchicum contains in 0·06 gramme 0·0006 gramme, and in 1 grain about 1/100 grain, of colchicine.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM

[Ext. Colocynth. Co.]

Compound Extract of Colocynth

Colocynth, crushed . . .	270 grammes
Aloes, in *fine powder* . . .	560 grammes
Scammony Resin, in *fine powder*	185 grammes
Curd Soap, in *fine powder* . .	140 grammes
Cardamom, in *fine powder* . .	45 grammes
Alcohol (60 per cent.) . . .	7000 millilitres

Macerate the Colocynth in the Alcohol (60 per cent.) for four days; strain; press the marc; mix the liquids obtained; remove the alcohol; evaporate the residue to dryness, and powder finely; add the Aloes, Scammony Resin, Curd Soap, and Cardamom; mix.

In making Compound Extract of Colocynth the Alcohol (60 per cent.) may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

DOSES

Metric.	**Imperial.**
0·12 to 0·5 gramme.	**2 to 8 grains.**

EXTRACTUM ERGOTÆ LIQUIDUM

[Ext. Ergot. Liq.]

Liquid Extract of Ergot

Liquid Extract of Ergot, when freshly prepared, contains 0·06 per cent. w/v of the total alkaloids of Ergot, calculated as ergotoxine; after storage, it contains not less than 0·04 per cent. w/v of the total alkaloids of Ergot, calculated as ergotoxine.

Ergot, in *moderately fine powder*	1000 grammes
Tartaric Acid	of each a sufficient quantity
Alcohol (50 per cent.)	

Pack the Ergot in a percolator, add sufficient *light petroleum* (*boiling-point, 40° to 50°*) to saturate the drug and to form a layer above it. When the liquid begins to drip from the percolator close the outlet, and macerate for twenty-four hours; then allow percolation to proceed, continuing the addition of *light petroleum* (*boiling-point, 40° to 50°*), until 1 millilitre of the percolate leaves not more than a barely perceptible film when evaporated in a glass basin. Remove the marc from the percolator, and dry it by exposing it to the air, gradually heating it, if necessary, to a temperature not exceeding 40°. Again reduce it to powder, and moisten it with a sufficient quantity of a 1 per cent. w/v solution of Tartaric Acid in Alcohol (50 per cent.) to render it evenly damp, and macerate for four to six hours in a tightly closed container. Pack the drug in a percolator, add a sufficient quantity of the same menstruum to maintain a layer above the drug. When the liquid begins to drip from the percolator, close the outlet, cover the percolator, macerate for forty to forty-eight hours, then allow percolation to proceed slowly, Exhaust Male Fern, in *moderately coarse powder*, by percolation with Ether; remove the ether and evaporate the remainder of the percolate on a water-bath until an oily extract remains. Determine the proportion of filicin in the extract by the Assay described below. To the remainder add, if necessary, a sufficient quantity of Olive Oil to produce an extract of the required strength.

Characters. A thick, dark green liquid, frequently containing a granular sediment.

Tests for Purity. *Specific gravity* (15·5°/15·5°), not less than 1·000; *refractive index* at 40°, not less than 1·492.

Assay. Dissolve 5 grammes in 40 millilitres of *ether*, transfer to a separator, add 100 millilitres of *solution of barium hydroxide*, shake vigorously for five minutes, and allow to separate. Filter off 87 millilitres of the aqueous liquid, equivalent to 4 grammes of the extract of male fern being tested, acidify this with *hydrochloric acid*, and extract with three successive quantities of 30, 20 and 15 millilitres of *ether*. Filter the ethereal solutions; wash the filter with *ether*; evaporate; dry the residue at 100°, and weigh the extracted filicin.

Storage. Extract of Male Fern should be kept in a well-closed container, and should be thoroughly stirred before use.

DOSES

Metric.	Imperial.
3 to 6 mils.	45 to 90 minims.

EXTRACTUM GENTIANÆ

[Ext. Gent.]

Extract of Gentian

Macerate crushed Gentian in ten times its weight of Distilled Water for two hours, and boil for fifteen minutes; decant the clear liquid; press the marc; strain the expressed liquid, and mix it with the decanted liquid; evaporate to the consistence of a soft extract.

DOSES

Metric.	Imperial.
0·12 to 0·5 gramme.	2 to 8 grains

EXTRACTUM GLYCYRRHIZÆ

[Ext. Glycyrrh.]

Extract of Liquorice

Exhaust unpeeled Liquorice, in *coarse powder*, with Chloroform Water by percolation. Boil the percolate for five minutes; set aside for not less than twelve hours; decant the clear liquid, and filter the remainder. Mix the two liquids, and evaporate to the consistence of a soft extract.

DOSES

Metric.	**Imperial.**
0·6 to 2 grammes.	**10 to 30 grains.**

EXTRACTUM GLYCYRRHIZÆ LIQUIDUM

[Ext. Glycyrrh. Liq.]

Liquid Extract of Liquorice

Liquorice, unpeeled, in *coarse powder*	1000 grammes
Chloroform Water Alcohol (90 per cent.)	of each a sufficient quantity

Exhaust the Liquorice with Chloroform Water by percolation. Boil the percolate for five minutes; set aside for not less than twelve hours, decant the clear liquid, and filter the remainder; mix the two liquids, and evaporate until the liquid has a *specific gravity* (15·5°/15·5°) of 1·200. Add to this liquid, when cold, one-fourth of its volume of Alcohol (90 per cent.). Set aside for not less than forty-eight hours; filter.

Alcohol content, 16 to 20 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

EXTRACTUM HAMAMELIDIS LIQUIDUM

[Ext. Hamam. Liq.]

Liquid Extract of Hamamelis

Hamamelis, in *moderately coarse powder*	1000 grammes
Alcohol (45 per cent.), sufficient to produce . . .	1000 millilitres

Exhaust the Hamamelis by percolation with Alcohol (45 per cent.), and reserve the first 850 millilitres of the percolate; remove the alcohol from the remainder of the percolate, and evaporate the residue to a soft extract. Dissolve this in the reserved portion, and add sufficient Alcohol (45 per cent.) to produce the required volume. Set aside for not less than twelve hours; filter.

Alcohol content, 32 to 40 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

EXTRACTUM HEPATIS LIQUIDUM

[Ext. Hepat. Liq.]

Liquid Extract of Liver

Liquid Extract of Liver is a selected fraction of an alcoholic extract of ox or sheep liver, dissolved in a mixture of Glycerin, Alcohol and Distilled Water. It contains the specific principle which increases the number of red corpuscles in the blood of persons suffering from pernicious anæmia.

Liquid Extract of Liver is prepared by extracting trimmed ox or sheep liver by the process described under 'Extractum Hepatis Siccum'. The extract, obtained by precipitation and granulation with Dehydrated Alcohol, is collected on a filter and dissolved in Distilled Water, and the *alcohol content* is determined by *Method I*. Glycerin, Alcohol (95 per cent.) and Distilled Water are added in such proportions that 1000 millilitres of the resulting liquid contains a quantity of the extract equivalent to 8000 grammes of the original liver, not less than the equivalent of 10 per cent. v/v of Alcohol (95 per cent.), and not less than 20 per cent. v/v of Glycerin.

Storage. Liquid Extract of Liver should be kept in a well-closed container, and stored in a cool place. It may lose activity on keeping and should be used as soon as possible.

Labelling. The label on the container states the equivalent of fresh liver in 30 mils, or in 1 fluid ounce.

DOSES

Metric.	Imperial.
30 mils.	**1 fluid ounce.**

Liquid Extract of Liver contains in 30 mils the equivalent of 240 grammes, and in 1 fluid ounce the equivalent of 8 ounces, of fresh liver.

EXTRACTUM HEPATIS SICCUM

[Ext. Hepat. Sicc.]

Dry Extract of Liver

Synonym. Extract of Liver.

Dry Extract of Liver is a selected fraction of an alcoholic extract of ox or sheep liver, and contains the specific principle, which increases the number of red corpuscles in the blood of persons suffering from pernicious anæmia.

Mince 8000 grammes of trimmed ox or sheep liver; add 6000 millilitres of Alcohol (80 per cent.) and 5·5 millilitres of a mixture of equal volumes of Sulphuric Acid and Distilled Water; set aside for twelve to eighteen hours, stirring frequently; filter, and reserve the filtrate.

Collect the residual liver tissue and add to it 12,500 millilitres of Alcohol (50 per cent.); set aside for a further twelve to eighteen hours, stirring frequently; filter. Mix the two filtrates, and evaporate the mixture under reduced pressure to 800 millilitres; add 800 millilitres of Dehydrated Alcohol; allow the resulting precipitate to settle; decant the clear solution, and filter the remainder, or separate the liquid from the solid matter by means of a centrifuge, washing the filter, or the centrifuge vessel and contents, with Alcohol (50 per cent.). By evaporation under reduced pressure remove the alcohol from the mixed liquids, and reduce the residue to a syrupy consistence; then pour the product, with constant stirring, into ten times its volume of Dehydrated Alcohol. Manipulate, below the surface of the liquid, the extract which is precipitated, so as to expose as great a surface as possible to the dehydrating action of the alcohol; then pour off the alcohol, and replace it with a further sufficient quantity of Dehydrated Alcohol; let the extract remain exposed to the dehydrating action of the alcohol, until it becomes brittle. Remove the alcohol by filtration; dry the extract in vacuo; ~~reduce it to powder as rapidly as possible, then dry again in vacuo~~. ✓ Weigh the dry powder; mix it ~~with not less~~ than one-tenth ~~of its weight of finely~~ powdered dry Sodium ~~Chloride; transfer~~ the product as quickly as possible to tubes, placing in each the amount equivalent to 225 grammes of the original liver. Close the tubes hermetically. ✓ This is right Procedure.

Characters. A light, brown, very hygroscopic powder; odour, faintly meatlike; taste, saltish and meatlike.

Soluble in *water*; almost insoluble in *alcohol* (*90 per cent.*).

Storage. Dry Extract of Liver should be kept in glass tubes, hermetically closed so as to exclude moisture, and stored in a cool place.

DOSE

The quantity equivalent to 225 grammes, or about half-a-pound, of fresh liver.

EXTRACTUM HYOSCYAMI LIQUIDUM

[Ext. Hyoscy. Liq.]

Liquid Extract of Hyoscyamus

Liquid Extract of Hyoscyamus contains 0·05 per cent. w/v of the alkaloids of Hyoscyamus, calculated as hyoscyamine (limits, 0·045 to 0·055).

Hyoscyamus, in *moderately coarse powder*	1000 grammes
Alcohol (70 per cent.) .	a sufficient quantity

Exhaust the Hyoscyamus by percolation with Alcohol (70 per cent.), reserving the first 850 millilitres of the percolate. Remove the alcohol from the remainder of the percolate by distillation under reduced pressure at a temperature not exceeding 60°; evaporate the residue to a soft extract at a temperature not exceeding 60°; dissolve this in the reserved portion. Determine the proportion of alkaloids in the liquid, thus obtained, by the Assay described below. To the remainder of the liquid add sufficient Alcohol (70 per cent.) to produce a Liquid Extract of Hyoscyamus of the required strength. Set aside for not less than twenty-four hours; filter, if necessary.

Assay. Evaporate 50 millilitres at a low temperature to about 15 millilitres. Transfer to a separator with 40 millilitres of *chloroform* and a mixture of 15 millilitres of *water* and 5 millilitres of *dilute solution of ammonia*, shake well, allow to separate, and run off the lower layer. Continue the extraction with further portions of *chloroform*, until *complete extraction* of the alkaloids is effected. Mix the chloroform solutions, shake with 25 millilitres of *N/5 sulphuric acid*, and continue the extraction with further portions of *N/10 sulphuric acid*, until *complete extraction* of the alkaloids is effected. Mix the acid liquids, and wash with successive portions of 10 millilitres, 5 millilitres and 5 millilitres of *chloroform*, separating and washing each chloroform solution with 20 millilitres of *N/10 sulphuric acid* contained in a second separator, and rejecting the chloroform. Filter both of the acid liquids through a tightly packed plug of cotton wool, previously moistened with *water*, wash the separators and plug with a little *N/10 sulphuric acid*, add excess of *dilute solution of ammonia*, and shake with successive quantities of *chloroform*, until *complete extraction* of the alkaloids is effected, washing each chloroform solution with the same 10 millilitres of *water* contained in a second separator. Remove the chloroform, add 3 millilitres of *alcohol (95 per cent.)*, evaporate to dryness, and dry at 80° for two hours. Dissolve the residue in 10 millilitres of *N/50 sulphuric acid*, and titrate with *N/50 sodium hydroxide*, using *solution of methyl red*, or *tincture of cochineal*, as indicator. Each millilitre of *N/50 sulphuric acid* is equivalent to 0·005784 gramme of alkaloid, calculated as hyoscyamine.

Alcohol content, 60 to 70 per cent. v/v of ethyl alcohol.

Preparation. Tinctura Hyoscyami.

DOSES

Metric.	**Imperial.**
0·2 to 0·4 mil.	**3 to 6 minims.**

Liquid Extract of Hyoscyamus contains in 0·4 mil 0·0002 gramme, and in 6 minims about $^1/_{370}$ grain, of the alkaloids of Hyoscyamus, calculated as hyoscyamine.

EXTRACTUM HYOSCYAMI SICCUM

[Ext. Hyoscy. Sicc.]

Dry Extract of Hyoscyamus

Synonyms. Extractum Hyoscyami: Extract of Hyoscyamus.

Dry Extract of Hyoscyamus contains 0·3 per cent. of the alkaloids of Hyoscyamus, calculated as hyoscyamine (limits, 0·27 to 0·33).

Hyoscyamus, in *moderately coarse powder*	1000 grammes
Hyoscyamus, in *fine powder*, dried at 80°	of each a sufficient quantity.
Alcohol (70 per cent.)	

Percolate the Hyoscyamus, in *moderately coarse powder*, with Alcohol (70 per cent.), until 4000 millilitres of percolate have been obtained. Determine the proportion of total solids in the percolate by evaporating 20 millilitres, drying the residue at 80°, and weighing. Determine also the proportion of alkaloids in the percolate by the Assay described under 'Extractum Hyoscyami Liquidum', using 100 millilitres.

Having thus determined the proportion of total solids and of alkaloids in the percolate, calculate the amount of each that the remainder of the percolate will yield. Determine the proportion of alkaloids present in the Hyoscyamus, in *fine powder*, by the Assay described under 'Hyoscyamus'. Calculate the amount of Hyoscyamus, in *fine powder*, that must be added to the percolate to produce a dry extract containing 0·3 per cent. of alkaloids. Add to the percolate a somewhat smaller amount of the Hyoscyamus, in *fine powder*, than calculation has shown to be necessary; remove the alcohol, evaporate to dryness under reduced pressure at a temperature not exceeding 60°, and dry finally in a current of air at 80°. Powder the residue, add the final necessary amount of Hyoscyamus, in *fine powder*, and triturate in a dry, slightly-warmed mortar until thoroughly mixed. Pass the powdered Extract through a *No. 22 sieve.*

In making Dry Extract of Hyoscyamus the Alcohol (70 per cent.) may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

Assay. Mix about 10 grammes, accurately weighed, with 50 millilitres of *alcohol* (*70 per cent.*), warm on a water-bath, and allow to stand for half an hour, shaking frequently. Transfer to a percolator, and percolate slowly with warm *alcohol* (*70 per cent.*), until *complete extraction* of the alkaloids is effected. Evaporate the percolate at as low a temperature as possible to about 15 millilitres, and complete the Assay as directed under 'Extractum Hyoscyami Liquidum', commencing with the words 'Transfer to a separator . . . '.

Storage. Dry Extract of Hyoscyamus should be kept in a small, wide-mouthed, well-closed container, and stored in a cool place.

Preparation. Pilula Colocynthidis et Hyoscyami.

DOSES

Metric.	**Imperial.**
0·016 to 0·06 gramme.	**$^1/_4$ to 1 grain.**

Dry Extract of Hyoscyamus contains in 0·06 gramme 0·00018 gramme, and in 1 grain about $^1/_{350}$ grain, of the alkaloids of Hyoscyamus, calculated as hyoscyamine.

EXTRACTUM IPECACUANHÆ LIQUIDUM

[Ext. Ipecac. Liq.]

Liquid Extract of Ipecacuanha

Liquid Extract of Ipecacuanha contains 2 per cent. w/v of the total alkaloids of Ipecacuanha, calculated as emetine (limits, 1·9 to 2·1).

Ipecacuanha, in *fine powder* .	1000 grammes
Alcohol (90 per cent.) .	a sufficient quantity

Percolate the Ipecacuanha with Alcohol (90 per cent.) until 750 millilitres of percolate have been collected, reserving this portion. Continue the percolation, until exhaustion is complete; remove the alcohol from this percolate by distillation under reduced pressure at a temperature not exceeding 60°, and dissolve the residual extract in the reserved portion. Determine the proportion of alkaloids in the liquid, thus obtained, by the Assay described below. To the remainder of the liquid add sufficient Alcohol (90 per cent.) to produce a Liquid Extract of Ipecacuanha of the required strength. Set aside for not less than twenty-four hours; filter.

Assay. To 5 millilitres in a separator add 20 millilitres of *water*, 5 millilitres of *dilute sulphuric acid* and 10 millilitres of *chloroform*, and shake well. Run off the chloroform into a second separator, containing a mixture of 4 millilitres of *alcohol (95 per cent.)* and 20 millilitres of *N/10 sulphuric acid*, shake, allow to separate, and reject the chloroform. Continue the extraction of the liquid in the first separator with two further quantities of 10 millilitres each of *chloroform*, transferring the chloroform solution each time to the second separator, and washing as before. Transfer the acid liquid from the second separator to the first separator, make distinctly alkaline with *dilute solution of ammonia*, and shake with successive quantities of *chloroform*, until *complete extraction* of the alkaloids is effected, washing each chloroform solution with the same 10 millilitres of *water* contained in a third separator. Remove the chloroform, add to the residue 2 millilitres of *alcohol (95 per cent.)*, evaporate to dryness, and dry for about five minutes at 100°. Dissolve the residue in 10 millilitres of *N/10 sulphuric acid*, and titrate with *N/10 sodium hydroxide*, using *solution of methyl red*, or *tincture of cochineal*, as indicator. Each millilitre of *N/10 sulphuric acid* is equivalent to 0·0240 gramme of total alkaloids, calculated as emetine.

Alcohol content, 75 to 80 per cent. v/v of ethyl alcohol.

Preparation. Tinctura Ipecacuanhæ.

DOSES

Metric.	**Imperial.**
0·03 to 0·12 mil.	**$^1/_2$ to 2 minims.**

Emetic Doses

0·6 to 2 mils.	**10 to 30 minims.**

Liquid Extract of Ipecacuanha contains in 0·12 mil 0·0024 gramme, and in 2 minims about $^1/_{25}$ grain, of the total alkaloids of Ipecacuanha, calculated as emetine.

EXTRACTUM KRAMERIÆ SICCUM

[Ext. Kramer. Sicc.]

Dry Extract of Krameria

Synonyms. Extractum Krameriæ: Extract of Krameria.

Exhaust Krameria, in *coarse powder*, with Distilled Water by percolation; evaporate the percolate to dryness under reduced pressure.

Storage. Dry Extract of Krameria should be kept in a small, wide-mouthed, well-closed container, and stored in a cool place.

Preparations. Trochiscus Krameriæ.
Trochiscus Krameriæ et Cocainæ.

DOSES

Metric.	**Imperial.**
0·3 to 1 gramme.	**5 to 15 grains.**

EXTRACTUM MALTI

[Ext. Malt.]

Extract of Malt

Extract of Malt is prepared from sound, malted grain of barley, *Hordeum distichon* Linn., by digestion with water at a suitable temperature, and by evaporation of the strained liquid under reduced pressure at a temperature not exceeding 55°, until a viscous product is obtained. It contains nitrogen equivalent to not less than 4·5 per cent. w/w of protein.

Characters. An amber or yellowish-brown, viscous liquid; odour, agreeable and characteristic; taste, sweet.

Tests for Purity. Miscible with *water* in all proportions, forming a translucent solution.

Specific gravity (15·5°/15·5°), 1·40 to 1·42; *refractive index* at 20°, 1·4892 to 1·4976.

Arsenic limit, 1·4 parts per million.

Assay. Transfer about 5 grammes, accurately weighed, to a long-necked flask, and add 10 grammes of *potassium sulphate* and 30 millilitres of *nitrogen-free sulphuric acid*. Add a small crystal of *copper sulphate*, and heat until a clear, pale blue liquid is obtained. Cool, dilute with *water*, transfer to an ammonia distillation apparatus, add an excess of a 40 per cent. w/v solution of *sodium hydroxide* in *water*, and distil the liberated ammonia into 50 millilitres of *N/10 sulphuric acid*; titrate the excess of acid with *N/10 sodium hydroxide*, using *solution of methyl red* as indicator. Repeat the operation, using 1 gramme of *sucrose* instead of the Extract of Malt. The difference between the two titrations represents the acid required to neutralise the ammonia. Each millilitre of *N/10 sulphuric acid* is equivalent to 0·0014 gramme of nitrogen, or 0·00875 gramme of protein.

Preparation. Extractum Malti cum Oleo Morrhuæ.

DOSES

Metric.	Imperial.
4 to 16 mils.	60 to 240 minims.

EXTRACTUM MALTI CUM OLEO MORRHUÆ

[Ext. Malt. c. Ol. Morrh.]

Extract of Malt with Cod-liver Oil

Extract of Malt with Cod-liver Oil contains approximately 15 per cent. v/v of Cod-liver Oil.

Extract of Malt	900 grammes
Cod-liver Oil	100 grammes

Mix thoroughly with the aid of gentle heat.

DOSES

Metric.	Imperial.
4 to 16 mils.	60 to 240 minims.

Extract of Malt with Cod-liver Oil contains in 16 mils about 2·5 mils, and in 240 minims about 36 minims, of Cod-liver Oil.

EXTRACTUM NUCIS VOMICÆ LIQUIDUM

[Ext. Nuc. Vom. Liq.]

Liquid Extract of Nux Vomica

Liquid Extract of Nux Vomica contains 1·5 per cent. w/v of strychnine (limits, 1·425 to 1·575).

Nux Vomica, in *moderately coarse powder*	1000 grammes
Alcohol (70 per cent.) Alcohol (45 per cent.)	of each a sufficient quantity

Exhaust the Nux Vomica by percolation with Alcohol

(70 per cent.). Remove the alcohol from the percolate and concentrate the liquid until it measures 250 millilitres. To this liquid, while still hot, add 15 grammes of Hard Paraffin, heat to 60°, and shake vigorously. Allow to cool, perforate the solidified waxy layer, and pour off the liquid. Add 250 millilitres of Alcohol (70 per cent.), and filter. Determine the proportion of strychnine in the liquid by the Assay described below. To the remainder of the liquid add sufficient Alcohol (45 per cent.) to produce a Liquid Extract of Nux Vomica of the required strength. Set aside for not less than twenty-four hours; filter.

Assay. To 10 millilitres add 10 millilitres of *N/1 sulphuric acid*, 30 millilitres of *chloroform* and 20 millilitres of *water*. Complete the Assay as directed under 'Nux Vomica', commencing with the words 'Shake, allow to separate . . .'.

Alcohol content, 36 to 42 per cent. v/v of ethyl alcohol.

Preparation. Tinctura Nucis Vomicæ.

DOSES

Metric.	**Imperial.**
0·06 to 0·2 mil.	**1 to 3 minims.**

Liquid Extract of Nux Vomica contains in 0·2 mil 0·003 gramme and in 3 minims about 1/24 grain, of strychnine.

EXTRACTUM NUCIS VOMICÆ SICCUM

[Ext. Nuc. Vom. Sicc.]

Dry Extract of Nux Vomica

Synonym. Extractum Nucis Vomicæ.

Dry Extract of Nux Vomica contains 5 per cent. of strychnine (limits, 4·75 to 5·25).

Nux Vomica, in *moderately coarse powder*	1000 grammes
Calcium Phosphate . .	of each a sufficient quantity
Alcohol (70 per cent.) .	of each a sufficient quantity

Exhaust the Nux Vomica by percolation with Alcohol (70 per cent.). Remove the alcohol from the percolate, and concentrate the liquid until it measures 250 millilitres. To this liquid, while still hot, add 15 grammes of Hard Paraffin, heat to 60°, and shake vigorously. Allow to cool, perforate the solidified waxy layer, and pour off the liquid. Determine the proportion of total solids in the liquid by evaporating about 1 gramme, accurately weighed, drying the residue at 100°, and weighing. Determine also the proportion of strychnine in the liquid by the Assay described under 'Extractum Nucis Vomicæ Liquidum', using 5 millilitres. To the remainder of the liquid add the calculated amount of Calcium Phosphate required to produce a Dry Extract of Nux Vomica of the required strength. Evaporate to dryness, dry the residue at 100°, triturate until reduced to powder, and pass the powdered Extract through a *No. 22 sieve.*

In making Dry Extract of Nux Vomica the Alcohol (70 per cent.) may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

Assay. Weigh accurately 3 grammes, add 20 millilitres of *alcohol (50 per cent.)*, warm on a water-bath, and shake frequently during ten minutes. Filter through a small filter, and wash the flask and filter with successive portions of hot *alcohol (50 per cent.)*, until *complete extraction* of the alkaloids is effected. Evaporate the filtrate to about 20 millilitres, and transfer to a separator with 5 millilitres of *alcohol (95 per cent.)*, 10 millilitres of *N/1 sulphuric acid* and 30 millilitres of *chloroform.* Complete the Assay as directed under 'Nux Vomica', commencing with the words 'Shake, allow to separate . . .'.

Storage. Dry Extract of Nux Vomica should be kept in a small, wide-mouthed, well-closed container, and stored in a cool place.

DOSES

Metric.	Imperial.
0·015 to 0·06 gramme.	**$^1/_4$ to 1 grain.**

Dry Extract of Nux Vomica contains in 0·06 gramme 0·003 gramme, and in 1 grain about $^1/_{20}$ grain, of strychnine.

EXTRACTUM OPII SICCUM

[Ext. Opii Sicc.]

Dry Extract of Opium

Synonyms. Extractum opii aquosum I.A.: Extractum Opii:

Dry Extract of Opium contains 20 per cent. of morphine, calculated as anhydrous morphine (limits, 19 to 21).

Add to Opium, sliced, about five times its weight of boiling Distilled Water; set aside for six hours; strain; press the marc; mix the two liquids thus obtained, and ascertain the volume. Determine the proportion of morphine in the liquid by the Assay described under 'Tinctura Opii', using 40 millilitres, and determine the proportion of total solids, dried at 100°. Add to the remainder of the liquid the calculated amount of Calcium Phosphate required to produce a Dry Extract of Opium of the required strength. Evaporate to dryness, dry the residue at 100°, triturate until reduced to powder, and pass the powdered Extract through a *No. 22 sieve.*

Assay. Triturate in a mortar 4 grammes, accurately weighed, with 5 millilitres of *water*, until a uniform mixture is produced. Add a further 20 millilitres of *water* and 2 grammes of *calcium hydroxide*, and mix very thoroughly. Transfer the mixture to a tared flask, rinsing the mortar with portions of water sufficient to produce 86 grammes, and complete the Assay as directed under 'Opium', commencing with the words 'Stopper the flask and shake occasionally . . .'; 52 millilitres of the filtrate represent 2·5 grammes of the dry extract of opium being assayed.

Storage. Dry Extract of Opium should be kept in a small, wide-mouthed, well-closed container, and stored in a cool place.

DOSES

Metric.	**Imperial.**
0·015 to 0·06 gramme.	**$^1/_4$ to 1 grain.**

Dry Extract of Opium contains in 0·06 gramme 0·012 gramme, and in 1 grain $^1/_5$ grain, of morphine, calculated as anhydrous morphine.

INJECTO PITUITARY POSTERIORIS

Syn. EXTRACTUM PITUITARII LIQUIDUM

[Ext. Pituit. Liq.]

Pituitary (Posterior Lobe) Extract

CAUTION.—In any part of the British Empire in which Pituitary (Posterior Lobe) Extract is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Synonyms. Liquor Pituitarii: Solution of Pituitary: Pituitary Extract.

EXTRACTUM SENNÆ LIQUIDUM

[Ext. Senn. Liq.]

Liquid Extract of Senna

Senna Fruit, crushed . .	1000 grammes
Alcohol (90 per cent.) . .	250 millilitres
Chloroform Water, sufficient to produce	*1000 millilitres*

Macerate the Senna Fruit in 5000 millilitres of Chloroform Water for eight hours in a closed vessel; strain off the clear liquid. Repeat the maceration a second, and a third time, for eight hours, using 2000 millilitres of Chloroform Water for each maceration. After the third maceration, lightly press the marc; strain the expressed liquid, and mix it with the product of the previous macerations. Evaporate the mixed liquids, under reduced pressure at a temperature not exceeding 60°, to 750 millilitres. Add the Alcohol (90 per cent.); adjust the volume to 1000 millilitres by the addition of Chloroform Water. Set aside for not less than twenty-four hours; filter.

Alcohol content, 21 to 24 per cent. v/v of ethyl alcohol.

Preparation. Syrupus Sennæ.

DOSES

Metric.	**Imperial.**
0·6 to 2 mils.	**10 to 30 minims.**

FERRI CARBONAS SACCHARATUS

[Ferr. Carb. Sacch.]

Saccharated Iron Carbonate

Saccharated Iron Carbonate is ferrous carbonate, which may be partly oxidised, mixed with glucose. It contains not less than 50 per cent. of ferrous iron, calculated as $FeCO_3$.

Ferrous Sulphate . . .	1000 grammes
Liquid Glucose . . .	307 grammes
Sodium Carbonate . .	1078 grammes
Distilled Water . .	a sufficient quantity

Dissolve 150 grammes of the Liquid Glucose in 3000 millilitres of Distilled Water, and dissolve the Ferrous Sulphate in this solution. Dissolve the Sodium Carbonate in 1500 millilitres of Distilled Water, and to this add the solution of the Ferrous Sulphate and Liquid Glucose, stirring constantly. Then add 4000 millilitres of Distilled Water, mix thoroughly, and allow the precipitate to subside; decant *the supernatant liquid, and wash the precipitate with two successive quantities of 4000 millilitres of Distilled Water. Drain the washed precipitate; mix it with the remainder of the Liquid Glucose, and dry at a temperature not exceeding 100°. Powder the product.*

Characters. An olive-brown, slightly hygroscopic powder; taste, feebly chalybeate.

Partially soluble in *water*; soluble with effervescence in *dilute hydrochloric acid.*

Tests for Identity. Yields the *reactions* characteristic of iron, and of carbonates.

Shake 0·5 gramme with 5 millilitres of *water*, and filter; the filtrate, boiled with 5 millilitres of *solution of potassio-cupric tartrate*, produces a copious precipitate of cuprous oxide.

Tests for Purity. 0·5 gramme, dissolved in 10 millilitres of *water* and 1 millilitre of *hydrochloric acid*, complies with the *limit test for sulphates.*

Arsenic limit, 5 parts per million.

Assay. Dissolve about 0·8 gramme, accurately weighed, in 3 millilitres of *phosphoric acid*, diluted with 20 millilitres of warm *water*; add 20 millilitres of a 25 per cent. w/v aqueous solution of *sulphuric acid*, and titrate with *N/10 potassium dichromate*, using *solution of diphenylamine* as indicator. Each millilitre of *N/10 potassium dichromate* is equivalent to 0·01158 gramme of $FeCO_3$.

Storage. Saccharated Iron Carbonate should be kept in a well-closed container.

DOSES

Metric.	**Imperial.**
0·6 to 2 grammes.	**10 to 30 grains.**

Saccharated Iron Carbonate contains in 2 grammes about 0·5 gramme, and in 30 grains about 7½ grains, of iron.

FERRI ET AMMONII CITRAS

[Ferr. et Ammon. Cit.]

Iron and Ammonium Citrate

Iron and Ammonium Citrate is a complex ammonium ferric citrate, and may be prepared by saturating a warm aqueous solution of citric acid with freshly precipitated ferric hydroxide, adding a slight excess of a solution of ammonia, evaporating, and drying on glass plates at a temperature not exceeding 40°. It contains not less than 20·5 per cent., and not more than 22·5 per cent., of Fe.

Characters. Thin, dark red, transparent scales; taste, astringent. Deliquescent in moist air.

Soluble in 0·5 part of *water*; almost insoluble in *alcohol (90 per cent.)*.

Tests for Identity. Ignite gently, and dissolve the residue in *hydrochloric acid*; the solution yields the *reactions* characteristic of ferric salts.

Warm with *solution of sodium hydroxide*; ammonia is evolved; filter; the solution yields the *reactions* characteristic of citrates.

Tests for Purity. 0·25 gramme, dissolved in 5 millilitres of *water* and boiled with 2 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates*.

Arsenic limit, 5 parts per million.

Assay. Dissolve about 0·5 gramme, accurately weighed, in 15 millilitres of *water*, add 1 millilitre of *sulphuric acid*, and warm until the dark brown colour becomes pale yellow. Cool to 15°, and add *N/10 potassium permanganate* drop by drop, until a pink colour persists for five seconds. Add 15 millilitres of *hydrochloric acid* and 2 grammes of *potassium iodide*, set aside for three minutes, and titrate with *N/10 sodium thiosulphate*. Each millilitre of *N/10 sodium thiosulphate* is equivalent to 0·005584 gramme of Fe.

Storage. Iron and Ammonium Citrate should be kept in a well-closed container, protected from light.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	5 to 15 grains.

Iron and Ammonium Citrate contains in 1 gramme about 0·2 gramme, and in 15 grains about 3 grains, of iron.

FERRI ET QUININÆ CITRAS

[Ferr. et Quinin. Cit.]

Iron and Quinine Citrate

Iron and Quinine Citrate is a complex ammonium quinine ferric citrate, and may be prepared by dissolving freshly precipitated ferric hydroxide and quinine in a warm aqueous solution of citric acid, adding a solution of ammonia, evaporating, and drying on glass plates at a temperature not exceeding 40°. It contains not less than 14·5 per cent., and not more than 15·5 per cent., of anhydrous quinine, and not less than 12 per cent., and not more than 14 per cent., of Fe.

Characters. Thin, greenish-yellow scales; taste, bitter and chalybeate. Deliquescent in moist air.

Soluble in 0·5 part of *water.*

Tests for Identity. A 10 per cent. w/v aqueous solution is acid to *litmus.*

Ignite gently, and dissolve the residue in *hydrochloric acid*; the solution yields the *reactions* characteristic of ferric salts.

Warm with *solution of sodium hydroxide*; ammonia is evolved; filter; the solution yields the *reactions* characteristic of citrates.

1 gramme, dissolved in 10 millilitres of *water*, yields with a slight excess of *dilute solution of ammonia* a white precipitate which, when separated and washed, yields the reactions characteristic of quinine, described under 'Quininæ Sulphas'.

Tests for Purity. 0·2 gramme, dissolved in 5 millilitres of *water* and boiled with 2 millilitres of *hydrochloric acid,* complies with the *limit test for sulphates.*

Arsenic limit, 5 parts per million.

Assay. *For quinine.* Dissolve about 5 grammes, accurately weighed, in 25 millilitres of *water*, add a slight excess of *dilute solution of ammonia,* and extract with successive quantities of *ether,* until *complete extraction* of the quinine is effected. Remove the ether, dry at 100°, and weigh.

For iron. Evaporate the aqueous solution, which is left from the Assay for quinine, by heating on a water-bath until the ether and the excess of ammonia are completely expelled. Dilute to 100 millilitres with *water*, measure 20 millilitres of the solution, and complete the Assay as directed under 'Ferri et Ammonii Citras', using 20 millilitres of *hydrochloric acid.*

Storage. Iron and Quinine Citrate should be kept in a well-closed container, protected from light.

DOSES

Metric.	**Imperial.**
0·3 to 1 gramme.	**5 to 15 grains.**

Iron and Quinine Citrate contains in 1 gramme about 0·13 gramme of iron and about 0·15 gramme of quinine, and in 15 grains about 2 grains of iron and about 2¹/₄ grains of quinine.

FERRI SULPHAS

[Ferr. Sulph.]

Ferrous Sulphate

$FeSO_4,7H_2O$ . . . Mol. Wt. 278·0

Ferrous Sulphate may be prepared by the action of diluted sulphuric acid upon iron. It contains not less than 99 per cent. of $FeSO_4,7H_2O$.

Characters. Transparent green crystals, or a pale bluish-green crystalline powder; taste, metallic and astringent.

Soluble in about 1·5 parts of *water*; insoluble in *alcohol (90 per cent.)*.

Tests for Identity. Yields the *reactions* characteristic of ferrous salts, and of sulphates.

Tests for Purity. 1 gramme, dissolved in 2 millilitres of recently boiled and cooled *water*, forms a clear solution (absence of oxysulphate).

2 grammes, dissolved in 50 millilitres of *water* and acidified with 1 millilitre of *dilute sulphuric acid*, shows neither darkening nor precipitation on saturating with *hydrogen sulphide* (limit of copper, and of lead).

5 grammes, dissolved in 50 millilitres of *water*, requires for neutralisation not more than 1·0 millilitre of *N/10 sodium hydroxide*, using *solution of methyl orange* as indicator (limit of acidity).

Arsenic limit, 2 parts per million.

Assay. Dissolve about 1 gramme, accurately weighed, in 20 millilitres of *dilute sulphuric acid*, and titrate with *N/10 potassium permanganate*. Each millilitre of *N/10 potassium permanganate* is equivalent to 0·0278 gramme of $FeSO_4,7H_2O$.

Storage. Ferrous sulphate should be kept in a well-closed container.

Preparations. Ferri Carbonas Saccharatus.
Ferri Sulphas Exsiccatus.
Pilula Aloes et Ferri.
Pilula Ferri Carbonatis.

DOSES

Metric.	Imperial.
0·06 to 0·3 gramme.	1 to 5 grains.

Ferrous sulphate contains in 0·3 gramme about 0·06 gramme, and in 5 grains about 1 grain, of iron.

FERRI SULPHAS EXSICCATUS

[Ferr. Sulph. Exsic.]

Exsiccated Ferrous Sulphate

Exsiccated Ferrous Sulphate is Ferrous Sulphate deprived of part of its water of crystallisation by drying at a temperature of 40°. It contains not less than 80 per cent. of $FeSO_4$.

Characters. A greyish-white powder.

Slowly, but almost completely, soluble in freshly boiled and cooled *water.*

Tests for Identity. Yields the *reactions* characteristic of ferrous salts, and of sulphates.

Tests for Purity. 2 grammes dissolves slowly in a mixture of 7·5 millilitres of freshly boiled and cooled *water* and 0·5 millilitre of *N/1 sulphuric acid*, forming a clear solution.

Arsenic limit, 4 parts per million.

Assay. Dissolve about 0·5 gramme, accurately weighed, in 20 millilitres of *dilute sulphuric acid*, and titrate with *N/10 potassium permanganate.* Each millilitre of *N/10 potassium permanganate* is equivalent to 0·01519 gramme of $FeSO_4$.

Storage. Exsiccated Ferrous Sulphate should be kept in a well-closed container.

Preparations. Pilula Aloes et Ferri.
Pilula Ferri Carbonatis.

DOSES

Metric.	Imperial.
0·03 to 0·2 gramme.	$^1/_2$ to 3 grains.

Exsiccated Ferrous Sulphate contains in 0·2 gramme about 0·06 gramme, and in 3 grains about 1 grain, of iron.

FERRUM

[Ferr.]

Iron

Fe . . . . At. Wt. 55·84

Iron is metallic iron in the form of fine bright wire, having a diameter of about 0·1 millimetre (No. 42 Standard Wire Gauge).

Test for Purity. *Arsenic limit*, 200 parts per million.

Preparations. Syrupus Ferri Iodidi.
Syrupus Ferri Phosphatis Compositus.
Syrupus Ferri Phosphatis cum Quinina et Strychnina.

FERRUM REDACTUM

[Ferr. Redact.]

Reduced Iron

Reduced Iron may be obtained by the action of hydrogen upon ferric oxide. It contains not less than 80 per cent. of metallic iron.

Characters. A fine, greyish-black powder, free from metallic lustre, and from gritty particles.

Insoluble in *water*, and in *alcohol* (*90 per cent.*); almost completely soluble in *dilute hydrochloric acid*.

Tests for Identity. Evolves hydrogen on the addition of *hydrochloric acid*, and the solution yields the *reactions* characteristic of ferrous salts.

Test for Purity. *Arsenic limit*, 200 parts per million.

Assay. Shake in a stoppered flask for ten minutes about 0·25 gramme, accurately weighed, with a hot solution of 1·25 grammes of *copper sulphate* in 20 millilitres of *water*; filter rapidly, and wash the filter with water; acidify the mixed filtrate and washings with *sulphuric acid*, and titrate with *N/10 potassium permanganate*. Each millilitre of *N/10 potassium permanganate* is equivalent to 0·005584 gramme of Fe.

Storage. Reduced Iron should be kept in a well-closed container.

DOSES

Metric.	**Imperial.**
0·06 to 0·6 gramme.	**1 to 10 grains.**

Reduced Iron contains in 0·6 gramme about 0·48 gramme, and in 10 grains about 8 grains, of metallic iron.

FILIX MAS

[Filix Mas.]

Male Fern

Synonym. Aspidium.

Male Fern consists of the rhizome and leaf-bases of *Dryopteris Filix-mas* (Linn.) Schott, collected late in the autumn, divested of the roots and dead portions, and carefully dried, and not older than one year from the date of collection. It contains not more than 2 per cent. of other organic matter.

Characters. From 7 to 15 centimetres or more in length, the rhizome itself about 2 centimetres in diameter; entirely covered with the hard, persistent, curved, angular, dark-brown bases of the fronds, which, as well as the younger parts of the rhizome, bear numerous ramenta. Frond bases, green internally and exhibiting in transverse section usually from 7 to 9 pale yellow meristeles arranged in a diffuse circle; the xylem of the bundles composed mainly of large scalariform tracheids with pointed ends. Rhizome, yellowish-green internally; in transverse section, a hypodermal layer of a few rows of yellowish-brown, lignified, fibrous sclerenchyma; numerous shortly stalked, pear-shaped, secreting glands in the intercellular spaces of the ground tissue, which is composed of polygonal, cellulose parenchyma filled with small starch grains up to 18 microns in diameter; margins of the ramenta with two-celled projections, but no glands except at the base where there are usually two. Odour, slight; taste, at first sweetish and astringent, but subsequently bitter and nauseous.

Tests for Purity. Crystals of calcium oxalate absent. *Ash*, not more than 6 per cent.; *acid-insoluble ash*, not more than 2 per cent.

Preparation. Extractum Filicis.

DOSES

Metric.	Imperial.
4 to 12 grammes.	60 to 180 grains.

FLUORESCEINUM SOLUBILE

[Fluoresc. Solub.]

Soluble Fluorescein

$C_{20}H_{10}O_5Na_2$ . . . . Mol. Wt. 376·1

Soluble Fluorescein is the di-sodium salt of fluorescein, which may be prepared by the condensation of resorcinol and phthalic anhydride.

Characters. An orange-red powder; odourless; almost tasteless.

Soluble in 1 part of *water*, and in 5 parts of *alcohol* (*90 per cent.*).

Tests for Identity. An aqueous solution is strongly fluorescent, even in extreme dilution; the fluorescence disappears when the solution is made acid, and reappears when it is made alkaline.

The residue, left after incineration, yields the *reactions* characteristic of sodium.

1 drop of a 0·05 per cent. w/v aqueous solution, absorbed by a piece of filter paper, colours the paper yellow; on exposing the moist paper to the vapour of *bromine* for one minute and then to the vapour of ammonia, the yellow colour is changed to a deep pink.

0·01 gramme, dissolved in 5 millilitres of *water*, yields no precipitate on the addition of a 10 per cent. w/v aqueous solution of *sodium salicylate* (distinction from acriflavine).

Tests for Purity. Dissolve 0·1 gramme in 10 millilitres of *water*, add 2 millilitres of *hydrochloric acid*, filter, and add 0·1 millilitre of *solution of potassium ferrocyanide*; no turbidity, or precipitate, is produced immediately (limit of zinc).

Dissolve 0·1 gramme in 20 millilitres of *water*, add 1 millilitre of *nitric acid*, and filter; the filtrate complies with the *limit test for chlorides*.

Dissolve 0·1 gramme in 20 millilitres of *water*, add 1 millilitre of *hydrochloric acid*, and filter; the filtrate complies with the *limit test for sulphates*.

Loses, when dried at 105°, not more than 5 per cent. of its weight.

FŒNICULUM

[Fœnic.]

Fennel

Synonyms. Fœniculi Fructus : Fennel Fruit.

Fennel consists of the ripe fruits of *Fœniculum vulgare* Mill., collected from cultivated plants, and dried. It contains not more than 2 per cent. of other organic matter.

Characters. Fruits, often entire with the pedicel attached; mericarps, up to about 10 millimetres long and 4 millimetres broad; five-sided with a wider commissural side, tapering slightly towards base and apex, crowned with a stylopod; glabrous, greenish or yellowish-brown, with five paler prominent primary ridges. Each mericarp normally with four large dorsal vittæ and two large commissural vittæ, five vascular strands with vessels and fibres; an outer epidermis of polygonal cells with smooth cuticle; a mesocarp of large parenchymatous cells with lignified reticulate thickenings; an inner epidermis of elongated parenchymatous cells in groups of about six or more, parallel, many of the groups with the long axes of their cells at an angle with those of adjacent groups. Endosperm, not grooved, consisting of somewhat thick-walled parenchyma, containing fixed oil, small aleurone grains, and microsphæroidal crystals of calcium oxalate. Odour, aromatic; taste, strongly aromatic and camphoraceous.

Tests for Purity. *Ash*, not more than 12 per cent.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

GELATINUM

[Gelat.]

Gelatin

Gelatin is the product, obtained from certain animal tissues, such as skin, tendons, ligaments and bones, by extracting them with boiling water, by evaporating the aqueous extract, and by drying the residue in air.

Characters. Colourless or pale yellowish, translucent sheets, or shreds; odour and taste, slight.

Insoluble in cold *water*, but swells and softens when immersed in it, gradually absorbing from five to ten times its own weight of water; soluble in hot *water*; insoluble in *alcohol (90 per cent.)*, in *ether*, and in *chloroform*; soluble in a cold mixture of *glycerin* and *water*, and in *acetic acid*.

Tests for Identity. A dilute aqueous solution yields a precipitate with *solution of trinitrophenol*, and with *solution of tannic acid*, but not with other acids, and not with a dilute solution of *alum*, *solution of lead acetate*, or *test-solution of ferric chloride*.

Tests for Purity. A 2 per cent. w/v solution in hot *water* is odourless, and, on cooling, forms a transparent or translucent jelly.

Immerse 2 grammes, in strips, in 50 millilitres of recently boiled and cooled *water*, in a loosely closed flask for about half an hour. Warm on the water-bath until completely dissolved, and titrate the solution with *N/10 sodium hydroxide*, using *solution of phenolphthalein* as indicator; not more than 5 millilitres of *N/10 sodium hydroxide* is required (limit of acidity).

Sulphur dioxide limit, 1000 parts per million.

Leaves, on incineration, not more than 2 per cent. of residue.

GELATINUM ZINCI

[Gelat. Zinc.]

Gelatin of Zinc

Synonym. Unna's Paste.

Zinc Oxide, finely sifted . .	150 grammes
Gelatin, cut small	150 grammes
Glycerin	350 grammes
Distilled Water . . .	350 millilitres or a sufficient quantity

Soak the Gelatin in the Distilled Water, until thoroughly softened; add the Glycerin, and heat on a water-bath, until the Gelatin is dissolved; adjust the weight, if necessary, to 850 grammes by the addition of Distilled Water. Incorporate the Zinc Oxide, and stir, until about to set.

GENTIANA

[Gentian.]

Gentian

Synonyms. Gentianæ Radix : Gentian Root.

Gentian consists of the dried rhizome and root of *Gentiana lutea* Linn. It contains not more than 2 per cent. of other organic matter.

Characters. Nearly cylindrical pieces, entire or longitudinally split, varying in length, but seldom exceeding 2·5 centimetres in thickness; externally, yellowish-brown. Root, longitudinally wrinkled. Rhizome, with crowded encircling leaf-scars, frequently ending in a bud and sometimes branched. Tough when slightly moist, but brittle when dry; fractured surface, nearly uniform, reddish-yellow. Parenchyma, abundant, brown, thin-walled, containing small oil globules, and minute crystals but not more than an occasional starch grain; collenchyma with similar contents; vessels with reticulate or scalariform thickening; no sclerenchymatous cells or fibres. Odour, characteristic; taste, at first sweet but afterwards bitter and persistent.

Tests for Purity. *Water-soluble extractive*, not less than 33 per cent.; *ash*, not more than 6 per cent.

Preparations. Extractum Gentianæ.
Infusum Gentianæ Compositum Concentratum.
Infusum Gentianæ Compositum Recens.
Tinctura Gentianæ Composita.

DOSES

Metric.	**Imperial.**
0·6 to 2 grammes.	**10 to 30 grains.**

GLUCOSUM LIQUIDUM

[Glucos. Liq.]

Liquid Glucose

Liquid Glucose may be obtained by the hydrolysis of starch, and consists of a mixture of dextrose, maltose, dextrin and water.

Characters. A colourless, or almost colourless, very viscous syrup; odourless; taste, sweet.

Miscible with *water* in all proportions, forming a clear solution; partly soluble in *alcohol (90 per cent.)*.

Tests for Identity. An aqueous solution is dextro-rotatory, and yields a red precipitate on heating with *solution of potassio-cupric tartrate*.

Tests for Purity. *Refractive index* at 20°, not less than 1·490.

Titrate 5 grammes, dissolved in 25 millilitres of freshly boiled and cooled *water*, with *N/10 sodium hydroxide*, using *solution of phenolphthalein* as indicator; not more than 0·6 millilitre of *N/10 sodium hydroxide* is required (limit of acidity).

Arsenic limit, 2 parts per million. *Lead limit*, 2 parts per million. *Sulphur dioxide limit*, 450 parts per million.

Moisten 2 grammes with *sulphuric acid*, and ignite gently, again moisten with *sulphuric acid*, and reignite; the residue weighs not more than 0·012 gramme.

Preparation. Syrupus Glucosi Liquidi.

GLYCERINUM

[Glycer.]

Glycerin

$CH_2OH{\cdot}CHOH{\cdot}CH_2OH$ . . Mol. Wt. 92·06

Glycerin may be obtained by the hydrolysis of fats and fixed oils. It contains not less than 98 per cent. of $C_3H_8O_3$.

Characters. A clear, colourless, syrupy liquid; odourless; taste, sweet, followed by a sensation of warmth. Hygroscopic. When kept for some time at a low temperature, it may solidify, forming a mass of colourless crystals, which do not melt until the temperature reaches about 20°.

Miscible with *water*, and with *alcohol* (*90 per cent.*); insoluble in *ether*, in *chloroform*, and in fixed oils.

Tests for Identity. Heated with *potassium bisulphate*, it gives off irritating vapours. Heated in a Bunsen flame on a borax bead, it gives a green flame.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·260 to 1·265, corresponding to 98 to 100 per cent. of $C_3H_8O_3$; *refractive index* at 20°, 1·470 to 1·473.

A 10 per cent. w/v aqueous solution is neutral to *litmus*.

When strongly heated, it assumes not more than a faint yellow, and not a pink, colour; and, when further heated, it volatilises and burns with little or no charring, and with no odour of burnt sugar.

Mix 5 millilitres with 5 millilitres of *dilute solution of ammonia*, and heat to 60° for five minutes, add 0·5 millilitre of *solution of silver nitrate*, and keep in the dark for five minutes; no darkening is produced (absence of certain reducing substances).

Mix with an equal volume of *sulphuric acid*, the mixture being kept cool; not more than a pale straw colour is produced (limit of readily carbonisable substances).

Warm with an equal volume of *dilute sulphuric acid*, and shake vigorously; not more than a faint odour is produced (limit of fatty acids).

Mix 10 millilitres with 40 millilitres of *water*, 1 drop of *dilute solution of ammonia*, and 1 drop of *solution of tannic acid*; not more than a faint pink colour is produced (limit of iron).

Mix 10 millilitres with 30 millilitres of *water*, 1 millilitre of *dilute hydrochloric acid*, and 10 millilitres of *solution of hydrogen sulphide*; no colour is produced (limit of copper).

Arsenic limit, 4 parts per million. *Lead limit*, 1 part per million.

Leaves, on incineration, not more than 0·01 per cent. of residue.

Storage. Glycerin should be kept in a well-closed container.

Preparation. Suppositorium Glycerini.

DOSES

Metric.	Imperial.
4 to 8 mils.	60 to 120 minims.
By rectal injection.	
2 to 8 mils.	30 to 120 minims.

GLYCERINUM ACIDI BORICI

[Glycer. Acid. Boric.]

Glycerin of Boric Acid

Synonym. Glycerite of Boroglycerin.

Boric Acid	310 grammes
Glycerin, sufficient to produce .	1000 grammes

Heat 460 grammes of Glycerin to a temperature between 140° and 150°, add the Boric Acid, and heat until dissolved, stirring constantly; evaporate at a temperature not exceeding 150°, until the weight of the mixture has been reduced to 520 grammes, the stirring being continued. Add sufficient warmed Glycerin to produce the required weight; mix thoroughly.

DOSES

Metric.	Imperial.
0·6 to 2 mils.	10 to 30 minims.

GLYCERINUM ACIDI TANNICI

[Glycer. Acid. Tann.]

Glycerin of Tannic Acid

Tannic Acid	150 grammes
Glycerin	850 grammes

Mix; warm gently, until solution is effected.

DOSES

Metric.	Imperial.
0·6 to 2 mils.	10 to 30 minims.

GLYCERINUM ALUMINIS

[Glycer. Alum.]

Glycerin of Alum

Potash Alum, in crystals . .	130 grammes
Distilled Water . . .	60 millilitres
Glycerin	810 grammes

Powder the Alum; mix it with the Distilled Water and the Glycerin, and warm gently, until solution is effected; filter, if necessary.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

GLYCERINUM AMYLI

[Glycer. Amyli]

Glycerin of Starch

Synonym. Glycerite of Starch.

Starch	85 grammes
Distilled Water . . .	170 millilitres
Glycerin	745 grammes

Mix the Starch with the Distilled Water. Add the mixture to the Glycerin, previously heated to about 140°. Heat at a temperature not exceeding 140°, with constant stirring, until a translucent jelly is formed.

Storage. Glycerin of Starch should be kept in a well-closed container.

GLYCERINUM BORACIS

[Glycer. Borac.]

Glycerin of Borax

Borax	120 grammes
Glycerin	880 grammes

Powder the Borax; triturate with the Glycerin, and warm gently, with constant stirring, until solution is effected. Filter, if necessary.

DOSES

Metric.	Imperial.
2 to 4 mils.	30 to 60 minims.

GLYCERINUM PHENOLIS

[Glycer. Phenol.]

Glycerin of Phenol

Synonym. Glycerinum Acidi Carbolici.

Phenol	160 grammes
Glycerin	840 grammes

Mix; and warm gently, if necessary, until solution is effected.

Caution. Dilution with water renders Glycerinum Phenolis caustic. It may be diluted with Glycerin.

DOSES

Metric.	Imperial.
0·3 to 1 mil.	5 to 15 minims.

GLYCYRRHIZA

[Glycyrrh.]

Liquorice

Synonyms. Glycyrrhizæ Radix : Liquorice Root.

Liquorice consists of the peeled root and peeled subterranean stem of *Glycyrrhiza glabra* Linn. and other species of *Glycyrrhiza*; or the same in an unpeeled condition.

Characters. Peeled Liquorice occurs in nearly cylindrical, pale yellow pieces with a fibrous surface and coarsely fibrous fracture. In transverse section, the secondary phloem is wide, with phloem fibres in radially arranged groups, each group surrounded by a sheath of cells containing prismatic crystals of calcium oxalate; the wood is distinctly radiate with similar fibres, also large vessels with thick, yellow, pitted or reticulate walls and large lumina about 80 to 200 microns in diameter. In the parenchyma of both xylem and phloem are abundant starch grains, oval or rounded and not more than 20 microns in diameter; cork and sclerenchymatous cells absent. Odour, faint and characteristic; taste, sweet and almost free from bitterness.

Unpeeled Liquorice differs in possessing a yellowish-brown, or dark-brown, outer layer, externally longitudinally wrinkled, and composed of many layers of cork cells.

Powdered Liquorice is the powder of the peeled drug. A powder of the unpeeled drug is not used except when expressly named.

Tests for Purity. *Water-soluble extractive,* not less than 20 per cent.; *ash* of the peeled drug, not more than 6 per cent.; *ash* of the unpeeled drug, not more than 10 per cent.; *acid-insoluble ash,* not more than 2·5 per cent.

Preparations. Extractum Glycyrrhizæ.
Extractum Glycyrrhizæ Liquidum.
Pulvis Glycyrrhizæ Compositus.

DOSES

Metric.	Imperial.
1 to 4 grammes.	15 to 60 grains.

GUAIACOL

[Guaiacol.]

Guaiacol

Guaiacol consists principally of the methyl ether of *o*-dihydroxybenzene, $HO{\cdot}C_6H_4{\cdot}OCH_3$ $[HO : OCH_3 = 1 : 2]$, and may be obtained by fractional distillation from wood-tar creosote, or may be prepared synthetically.

Characters. A colourless, oily, highly refractive liquid, or colourless crystals; odour, penetrating and smoky; taste, caustic.

Soluble in 80 parts of *water*; miscible with *alcohol* (*90 per cent.*), with *ether,* and with fixed and volatile oils.

Tests for Identity. To 25 millilitres of a 1 per cent. w/v solution in *water* add 1 drop of *test-solution of ferric chloride*; a blue colour is produced, rapidly changing to brown, and the solution becomes turbid.

Shake 1 millilitre with 10 millilitres of *sulphuric acid* for one minute; a yellow, but not a reddish-brown, colour is produced (distinction from creosote).

Tests for Purity. *Specific gravity* (15·5°/15·5°) of the liquid form, 1·116 to 1·125; *melting-point* of the crystals, about 28°; *boiling-point,* not less than 95 per cent. distils between 200° and 210°.

Shake 2 grammes with 4 millilitres of *light petroleum* (*boiling-*

point, 50° to 60°); the mixture separates sharply into two layers both devoid of turbidity (absence of organic impurities).

Dissolve 1 gramme by heat in 2 millilitres of *solution of sodium hydroxide*; no appreciable change of colour is produced, and, on cooling, the mixture sets to a nearly white mass, which forms a clear solution with 25 millilitres of *water* (absence of hydrocarbons).

Leaves, when heated on a water-bath in a porcelain basin, not more than 0·1 per cent. of residue.

Storage. Guaiacol should be kept in a well-closed container, protected from light.

DOSES

Metric.	Imperial.
0·3 to 0·6 mil.	**5 to 10 minims.**

HAMAMELIS

[Hamam.]

Hamamelis

Synonyms. Hamamelidis Folia : Hamamelis Leaves : Witch Hazel Leaves.

Hamamelis consists of the dried leaves of *Hamamelis virginiana* Linn. It contains not more than 2 per cent. of other organic matter, and not more than 3 per cent. of stems.

Characters. Dark, brownish-green to green; mostly from 7 to 15 centimetres long, broadly oval to rhomboidal-ovate, shortly petiolate; lamina, with a sinuate-crenate margin and acute apex; asymmetrically cordate at the base; venation, pinnate, veins prominent on the under surface, the lateral veins nearly straight, terminating in the apex of a marginal crenation; bearing scattered stellate hairs which are abundant on young leaves. Epidermal cells with wavy walls; stomata on the under surface only, each usually with two cells with their long axes parallel to the pore; in the mesophyll, often extending from the upper to the under epidermis, occasional branching sclerenchymatous cells with thick lignified walls; also many cells with brown contents which are coloured black on the addition of *test-solution of ferric chloride*. In the midrib, a circle of xylem above which is a crescent-shaped xylem mass; pericycle of strongly lignified fibres, abutting on which are numerous cells each containing a single prismatic crystal of calcium oxalate; in the pith, occasional cluster crystals. Odour, not marked; taste, astringent and slightly bitter.

Preparation. Extractum Hamamelidis Liquidum.

HEXAMINA

[Hexamin.]

Hexamine

Synonym. Methenamina.

$C_6H_{12}N_4$ . . . . . Mol. Wt. 140·1

Hexamine is hexamethylenetetramine, and may be prepared by the combination of ammonia and formaldehyde. It contains not less than 99 per cent. of $C_6H_{12}N_4$.

Characters. Colourless crystals, or a white crystalline powder; odourless; taste, at first sweetish, afterwards bitter.

Soluble in about 1·5 parts of *water*, and in about 8 parts of *alcohol (90 per cent.)*.

Tests for Identity and Purity. A 10 per cent. w/v aqueous solution is alkaline to *litmus*.

At about 263°, it sublimes without melting, decomposes, and evolves a disagreeable odour.

Heated with *dilute sulphuric acid*, it gives off formaldehyde; and, when the solution is subsequently rendered alkaline with *solution of sodium hydroxide*, it gives off ammonia.

Arsenic limit, 2 parts per million. *Lead limit*, 2 parts per million.

Leaves, on incineration, not more than 0·05 per cent. of residue.

Assay. Dissolve about 1·5 grammes, accurately weighed, in 10 millilitres of *water*, add 50 millilitres of *N/1 sulphuric acid*, and boil gently until the odour of formaldehyde has disappeared, replacing from time to time the water lost by evaporation; titrate the excess of sulphuric acid with *N/1 sodium hydroxide*, using *solution of methyl red* as indicator. Each millilitre of *N/1 sulphuric acid* is equivalent to 0·03503 gramme of $C_6H_{12}N_4$.

Sterilisation of a Solution. A solution of Hexamine for injection is sterilised by *filtration*.

DOSES.

Metric.	Imperial.
0·6 to 2 grammes.	10 to 30 grains.

HOMATROPINÆ HYDROBROMIDUM

[Homatrop. Hydrobrom.]

Homatropine Hydrobromide

$C_{16}H_{21}O_3N,HBr$ . . . . Mol. Wt. 356·1

Homatropine Hydrobromide is the hydrobromide of an alkaloid, homatropine, prepared from tropine and mandelic acid.

Characters. A colourless, crystalline powder; odourless.

Soluble in 6 parts of *water*, and in 18 parts of *alcohol* (*90 per cent.*), the solubility increasing rapidly as the temperature rises.

A 1 per cent. w/v aqueous solution is neutral to *litmus*.

Tests for Identity. To 1 millilitre of a 1 per cent. w/v solution in *water* add 1 millilitre of *dilute solution of ammonia*, shake with *chloroform*, and evaporate the chloroform solution to dryness on a water-bath. Warm the residue with 1·5 millilitres of a 2 per cent. w/v solution of *mercuric chloride* in *alcohol* (*60 per cent.*); a yellow colour, becoming brick red, is produced (distinction from most other alkaloids, except atropine and hyoscyamine).

An aqueous solution gives the *reactions* characteristic of bromides.

Tests for Purity. *Melting-point*, about 214°, with partial decomposition.

A 5 per cent. w/v aqueous solution does not yield a precipitate with *solution of tannic acid* (limit of other alkaloids).

To 0·01 gramme add 5 drops of *nitric acid*, and evaporate to dryness in a porcelain dish on a water-bath. To the residue add a few drops of *alcoholic solution of potassium hydroxide*; no violet colour is produced (limit of atropine, hyoscyamine, and hyoscine).

0·2 gramme leaves, on incineration, not more than 0·0002 gramme of residue.

Sterilisation of a Solution. A solution of Homatropine Hydrobromine for injection is sterilised by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass*.

Preparation. Lamella Homatropinæ.

DOSES

Metric.	**Imperial.**
0·001 to 0·002 gramme.	**$^1/_{64}$ to $^1/_{32}$ grain.**

HYDRARGYRI IODIDUM RUBRUM

[Hydrarg. Iod. Rubr.]

Red Mercuric Iodide

Synonym. Mercuric Iodide.

HgI_2 . . . . . . Mol. Wt. 454·5

Red Mercuric Iodide may be obtained by the interaction of aqueous solutions of mercuric chloride and potassium iodide. It contains not less than 99 per cent. of HgI_2.

Characters. A scarlet-red powder.

Almost insoluble in *water*; sparingly soluble in *alcohol* (*90 per cent.*); soluble in 150 parts of *ether*; completely soluble in a solution of *potassium iodide.*

Tests for Identity. When heated to about 150°, it becomes yellow, but resumes its original colour on cooling. When heated to about 350°, it fuses and volatilises, giving a yellow crystalline sublimate.

Yields the *reactions* characteristic of mercuric salts, and of iodides.

Tests for Purity. Shake 1 gramme with 20 millilitres of *water* for one minute, and filter; a portion of the filtrate does not give a deeper colour with *hydrogen sulphide* than that given by an equal volume of a solution, containing 0·005 per cent. of *mercuric chloride.* 5 millilitres of the filtrate complies with the *limit test for chlorides.*

Leaves, when volatilised, not more than 0·1 per cent. of residue.

Assay. To about 0·5 gramme, accurately weighed, add 10 millilitres of *water* and 1 gramme of *zinc powder*, stir well, and set aside for ten minutes. Filter, wash until the washings give no *reaction* for iodides. To the combined filtrate and washings add 30 millilitres of *N/10 silver nitrate* and 5 millilitres of *nitric acid*, and titrate with *N/10 ammonium thiocyanate*, using *solution of ferric ammonium sulphate* as indicator. Each millilitre of *N/10 silver nitrate* is equivalent to 0·02272 gramme of HgI_2.

Preparation. Liquor Arseni et Hydrargyri Iodidi.

DOSES

Metric.	**Imperial.**
0·002 to 0·004 gramme.	**$^1/_{32}$ to $^1/_{16}$ grain.**

HYDRARGYRI OXIDUM FLAVUM

[Hydrarg. Oxid. Flav.]

Yellow Mercuric Oxide

HgO . . . . . Mol. Wt. 216·6

Yellow Mercuric Oxide may be obtained by the interaction of aqueous solutions of mercuric chloride and sodium hydroxide. It contains not less than 99·3 per cent.

of HgO, calculated with reference to the substance dried at 150° for one hour.

Characters. An orange-yellow, amorphous powder; odourless. Insoluble in *water*, and in *alcohol* (*90 per cent.*); readily soluble in *nitric acid.*

Tests for Identity. When gently heated, it assumes a red colour; and when strongly heated, it decomposes into oxygen and mercury. A solution in acid yields the *reactions* characteristic of mercuric salts.

Tests for Purity. Shake 1 gramme with 5 millilitres of *water*, and allow to settle; the supernatant liquid is neutral to *litmus.*

A solution of 0·5 gramme in 25 millilitres of *dilute hydrochloric acid* is not more than slightly turbid (limit of mercurous salts).

0·2 gramme, dissolved in *water* by the addition of 3 millilitres of *nitric acid*, complies with the *limit test for chlorides.*

Loses, when heated at 150° for one hour, not more than 1 per cent. of its weight.

Leaves, when ignited, not more than 0·5 per cent. of residue.

Assay. Dissolve about 0·4 gramme, accurately weighed, in 5 millilitres of *nitric acid* and 10 millilitres of *water*, and dilute with *water* to 150 millilitres. Titrate with *N/10 ammonium thiocyanate*, using *solution of ferric ammonium sulphate* as indicator. Each millilitre of *N/10 ammonium thiocyanate* is equivalent to 0·01083 gramme of HgO.

Storage. Yellow Mercuric Oxide should be protected from light.

Preparations. Hydrargyrum Oleatum.
Unguentum Hydrargyri Oleati.
Oculentum Hydrargyri Oxidi.

HYDRARGYRI OXYCYANIDUM

[Hydrarg. Oxycyanid.]

Mercuric Oxycyanide

$HgO,3Hg(CN)_2$ . . . Mol. Wt. 974·5

Mercuric Oxycyanide may be prepared by the interaction of mercuric oxide and excess of mercuric cyanide in the presence of water. It contains not less than 20 per cent., and not more than 22 per cent., of HgO, and not less than 77 per cent., and not more than 79 per cent., of $Hg(CN)_2$.

Characters. A white crystalline powder.

Soluble in about 18 parts of *water.*

An aqueous solution is alkaline to *litmus.*

Tests for Identity. When *hydrogen sulphide* is passed through an aqueous solution, a black precipitate is produced. The solution, after acidifying with *dilute sulphuric acid*, filtering, and boiling until all excess of hydrogen sulphide has been expelled, gives the *reactions* characteristic of cyanides.

Tests for Purity. 1 gramme, dissolved in *water* with the addition of 3 millilitres of *nitric acid* by heating in a boiling water-bath for fifteen minutes, complies, when cooled, with the *limit test for chlorides.*

Loses, when dried at 100°, not more than 1 per cent. of its weight.

Leaves, on ignition, not more than 0·1 per cent. of residue.

Assay. *For mercuric oxide.* Dissolve about 0·5 gramme, accurately weighed, in 50 millilitres of *water*, add 1 gramme of *sodium chloride*, and titrate with *N/10 hydrochloric acid*, using *solution of methyl orange* as indicator. Each millilitre of *N/10 hydrochloric acid* is equivalent to 0·01083 gramme of HgO.

For mercuric cyanide. Continue the previous titration after the addition of 2 to 3 grammes of *potassium iodide.* Each additional millilitre of *N/10 hydrochloric acid* is equivalent to 0·01263 gramme of $Hg(CN)_2$.

DOSES

Metric.	**Imperial.**
By intramuscular injection.	
0·005 to 0·01 gramme.	**$^1/_{12}$ to $^1/_6$ grain.**
By intravenous injection.	
0·01 gramme.	**$^1/_6$ grain.**

HYDRARGYRI PERCHLORIDUM

[Hydrarg. Perchlor.]

Mercuric Chloride

Synonyms. Hydrargyri Chloridum Corrosivum : Perchloride of Mercury : Corrosive Sublimate.

$HgCl_2$ . . . . . Mol. Wt. 271·5

Mercuric Chloride may be obtained by the direct combination of mercury and chlorine. It contains not less than 99·5 per cent. of $HgCl_2$.

Characters. Heavy, colourless or white, rhombic crystalline masses, or a white crystalline powder. When heated, it fuses to a colourless liquid which, on further heating, volatilises as a dense white cloud.

Soluble in 18 parts of *water*, in 4 parts of *alcohol* (*90 per cent.*), in *ether*, and in *glycerin*.

Tests for Identity. Yields the *reactions* characteristic of mercuric salts, and of chlorides.

Tests for Purity. 1 gramme dissolves completely in 20 millilitres of *water*.

Leaves, when volatilised, not more than 0·1 per cent. of residue.

Assay. Dissolve in a stoppered flask about 0·3 gramme, accurately weighed, in 85 millilitres of *water*; add 10 millilitres of *solution of potassium iodide*, 3 millilitres of *solution of formaldehyde*, and 15 millilitres of *solution of sodium hydroxide*. Shake continuously for two minutes; add 20 millilitres of *acetic acid* and 35 millilitres of *N/10 iodine*. Shake continuously for about ten minutes, or until the precipitated mercury is completely redissolved, and titrate the excess of iodine with *N/10 sodium thiosulphate*. Each millilitre of *N/10 iodine* is equivalent to 0·01358 gramme of $HgCl_2$.

Preparation. Liquor Hydrargyri Perchloridi.

DOSES

Metric.	Imperial.
0·002 to 0·004 gramme.	$^1/_{32}$ to $^1/_{16}$ grain.

HYDRARGYRI SUBCHLORIDUM

[Hydrarg. Subchlor.]

Mercurous Chloride

Synonyms. Calomel: Subchloride of Mercury.

HgCl . . . . . . Mol. Wt. 236·1

Mercurous Chloride may be obtained as a sublimate by heating a mixture of mercurous sulphate and sodium chloride. It contains not less than 99·6 per cent. of HgCl.

Characters. A dull white, heavy powder; odourless; almost tasteless. Becomes yellow, when triturated or compressed. Volatilises, when strongly heated.

Insoluble in *water*, in *alcohol* (*90 per cent.*), in *ether*, and in cold dilute acids.

Tests for Identity. Blackened by contact with *dilute solution of ammonia*.

Heated in a hard glass tube with an equal weight of *anhydrous sodium carbonate*, it yields a sublimate of metallic mercury;

when the residue is dissolved in *dilute nitric acid* and the solution filtered, the filtrate gives the *reactions* characteristic of chlorides.

Tests for Purity. Shake 2 grammes with 20 millilitres of cold *water* for five minutes, and filter; the filtrate is not darkened by *hydrogen sulphide* (limit of mercuric chloride).

Heat 1 gramme with 5 millilitres of *solution of sodium hydroxide*; no ammonia is evolved (absence of ammoniated mercury).

Leaves, when volatilised, not more than 0·1 per cent. of residue.

Assay. Mix about 0·7 gramme, accurately weighed, with 10 millilitres of *water* in a glass-stoppered flask, and add 50 millilitres of *N/10 iodine* and 5 grammes of *potassium iodide*, dissolved in 10 millilitres of *water*. Close the flask, and set aside, shaking occasionally, until solution is complete. Titrate the excess of iodine with *N/10 sodium thiosulphate*. Each millilitre of *N/10 iodine* is equivalent to 0·02361 gramme of HgCl.

Preparations. Injectio Hydrargyri Subchloridi.
Lotio Hydrargyri Nigra.
Unguentum Hydrargyri Subchloridi.

DOSES

Metric.	**Imperial.**
0·03 to 0·2 gramme.	**$1/2$ to 3 grains.**
By intramuscular injection.	
0·03 to 0·06 gramme.	**$1/2$ to 1 grain.**

HYDRARGYRUM

[Hydrarg.]

Mercury

Hg . . . . . At. Wt. 200·6

Mercury is a liquid metal, which may be obtained from native mercuric sulphide. It contains not less than 99·5 per cent. of Hg.

Characters. A shining, silvery-white, heavy liquid, easily divisible into globules, and extremely mobile.

Insoluble in *water*, in *alcohol* (*95 per cent.*), and in *hydrochloric acid*; readily and completely soluble in *nitric acid*, and in boiling *sulphuric acid*.

Tests for Identity. *Specific gravity* (15·5°/15·5°), about 13·5. Readily volatilises, on heating, and boils at about 358°.

Test for Purity. Leaves, when volatilised at about 300°, not more than 0·02 per cent. of residue.

Assay. Dissolve about 0·4 gramme, accurately weighed, in 20 millilitres of a mixture of equal parts of *water* and *nitric acid*, and heat gently until the solution is colourless. Add 150 millilitres of *water*, and titrate with *N/10 ammonium thiocyanate*, using *ferric ammonium sulphate* as indicator. Each millilitre of *N/10 ammonium thiocyanate* is equivalent to 0·01003 gramme of Hg.

Preparations. Hydrargyrum cum Creta.
Injectio Hydrargyri.
Pilula Hydrargyri.
Unguentum Hydrargyri.
    Unguentum Hydrargyri Compositum.
Unguentum Hydrargyri Nitratis Forte.
    Unguentum Hydrargyri Nitratis Dilutum.

DOSES

Metric.	Imperial.
0·03 to 0·2 gramme.	1/2 to 3 grains.
By intramuscular injection.	
0·03 to 0·06 gramme.	1/2 to 1 grain.

HYDRARGYRUM AMMONIATUM

[Hydrarg. Ammon.]

Ammoniated Mercury

Synonym. White Precipitate.

NH_2HgCl . . . . . Mol. Wt. 252·1

Ammoniated Mercury may be obtained by the interaction of ammonia and mercuric chloride. It contains not less than 97 per cent., and not more than the equivalent of 100·5 per cent., of NH_2HgCl.

Characters. A white powder; odourless. Stable in air.

Insoluble in *water*, in *alcohol* (*90 per cent.*), and in *ether*; readily soluble in warm *hydrochloric acid*, and in warm *acetic acid*.

Gradually decomposed by prolonged washing with *water*, a yellow basic salt being produced.

Tests for Identity. When strongly heated, it volatilises without previous fusion.

When heated with *solution of sodium hydroxide*, it gives off ammonia and produces yellow mercuric oxide.

A solution in *acetic acid* yields the *reactions* characteristic of mercuric salts, and of chlorides.

Tests for Purity. 0·2 gramme, heated with 10 millilitres of *acetic acid* to about 70° and occasionally shaken, dissolves completely within a few minutes without effervescence (limit of mercurous chloride, and of carbonates).

Leaves, when ignited at a low red heat, not more than 0·2 per cent. of residue.

Assay. Mix about 0·25 gramme, accurately weighed, with 50 millilitres of *water*, add 3 grammes of *potassium iodide*, and shake occasionally, until solution is complete. Titrate with *N/10 hydrochloric acid*, using *solution of methyl orange* as indicator. Each millilitre of *N/10 hydrochloric acid* is equivalent to 0·0126 gramme of NH_2HgCl.

Storage. Ammoniated Mercury should be protected from light.

Preparation. Unguentum Hydrargyri Ammoniati.

HYDRARGYRUM CUM CRETA

[Hydrarg. c. Cret.]

Mercury with Chalk

Synonym. Grey Powder.

Mercury with Chalk contains 33 per cent. of Mercury (limits, 31 to 35).

Mercury	33 grammes
Chalk	67 grammes

Triturate together in a porcelain mortar, until the mixture acquires a uniform pale grey colour, and metallic globules cease to be visible, when examined under a lens magnifying four diameters.

Assay. Boil gently for five minutes about 1 gramme, accurately weighed, in 10 millilitres of *nitric acid* and 25 millilitres of *water*; cool, dilute with 25 millilitres of *water*, and titrate with *N/10 ammonium thiocyanate*, using *solution of ferric ammonium sulphate* as indicator. Each millilitre of *N/10 ammonium thiocyanate* is equivalent to 0·01003 gramme of Hg.

Storage. Mercury with Chalk should be kept in a well-closed bottle, and stored in a cool place.

DOSES

Metric.	Imperial.
0·06 to 0·3 gramme.	**1 to 5 grains.**

HYDRARGYRUM OLEATUM

[Hydrarg. Oleat.]

Oleated Mercury

Oleated Mercury contains the equivalent of 20 per cent. of Yellow Mercuric Oxide (limits, 19 to 21).

Yellow Mercuric Oxide . .	200 grammes
Liquid Paraffin . . .	50 grammes
Oleic Acid	750 grammes

Triturate the Yellow Mercuric Oxide with the Liquid Paraffin, until it is thoroughly subdivided; add the Oleic Acid, stirring vigorously. Heat the mixture to 50°, triturating occasionally until combination is effected; when cool, a greyish unctuous preparation is obtained.

Assay. Dissolve about 0·75 gramme, accurately weighed, in a mixture of 65 millilitres of *benzene*, 10 millilitres of *glacial acetic acid*, and 25 millilitres of *alcohol* (*90 per cent.*); warm on a water-bath to about 50°, and pass in *hydrogen sulphide* for ten minutes; filter through asbestos in a Gooch crucible, wash the precipitate first with hot *benzene*, and then with a little *alcohol* (*90 per cent.*); dry at 120°, and weigh. Each gramme of residue is equivalent to 0·931 gramme of HgO.

Preparation. Unguentum Hydrargyri Oleati.

HYOSCINÆ HYDROBROMIDUM

[Hyoscin. Hydrobrom.]

Hyoscine Hydrobromide

Synonym. Scopolamine Hydrobromide.

$C_{17}H_{21}O_4N,HBr,3H_2O$ . . . Mol. Wt. 438·1

Hyoscine Hydrobromide is the hydrobromide of an alkaloid, *l*-hyoscine (*l*-scopolamine), obtained from various plants of the Family Solanaceæ.

Characters. Colourless, transparent, rhombic crystals.

Readily soluble in *water*, and in *alcohol* (*90 per cent.*).

A 1 per cent. w/v aqueous solution is neutral, or not more than slightly acid, to *litmus*.

Tests for Identity. Add 5 drops of *nitric acid* to about 0·01 gramme, and evaporate to dryness in a porcelain dish on a water-bath; the residue gives a violet colour on the addition of *alcoholic solution of potassium hydroxide.* (Atropine and hyoscyamine yield the same reaction; the reaction is masked by the presence of other alkaloids).

An aqueous solution gives the *reactions* characteristic of bromides.

Tests for Purity. *Melting-point* after drying at 100°, 194° to 196°; *specific rotation* of the anhydrous salt in 5 per cent. w/v aqueous solution, not less than − 24°, and not more than − 26°.

Add a few drops of *dilute solution of ammonia* to 1 millilitre of a 5 per cent. w/v aqueous solution; no turbidity is produced.

Add *solution of potassium hydroxide* to 1 millilitre of a 5 per cent. w/v aqueous solution; only a transient whitish turbidity is produced (absence of other alkaloids.)

Add 1 drop of *N/10 potassium permanganate* to 5 millilitres of a 1 per cent. w/v solution in *water*; the solution is not completely decolourised in five minutes (limit of readily oxidisable substances).

0·2 gramme loses, when dried at 100°, not less than 0·024 gramme, and not more than 0·026 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Hyoscine Hydrobromide should be kept in a well-closed container, protected from light, and stored in a cool place.

Sterilisation of a Solution. A solution of Hyoscine Hydrobromide for injection is sterilised by *Tyndallisation*, or by *filtration.* The containers comply with the *tests for limit of alkalinity of glass.*

Preparation. Oculentum Hyoscinæ.

DOSES

Metric.	**Imperial.**
0·0003 to 0·0006 gramme.	**$^1/_{200}$ to $^1/_{100}$ grain.**

HYOSCYAMUS

[Hyoscy.]

Hyoscyamus

Synonyms. Hyoscyami Folia : Hyoscyamus Leaves.

Hyoscyamus consists of the dried leaves and flowering tops of *Hyoscyamus niger* Linn. It contains not more than 2 per cent. of other organic matter, not more than 1 per cent. of its stem having a width greater than

5 millimetres, and not less than 0·05 per cent. of the alkaloids of Hyoscyamus, calculated as hyoscyamine.

Characters. Leaves, pale greyish-green; either sessile to shortly petiolate and ovate-oblong to triangular ovate, or with long petioles and ovate-lanceolate. The laminæ attain a length of about 25 centimetres and the petioles about 30 centimetres. Margin, irregularly dentate, or pinnatifid with acute triangular lobes; apex, acute; lamina, glandular-hairy; midrib, conspicuous; epidermal cells, in surface view, with wavy walls and smooth cuticle; stomata, of solanaceous type on both surfaces; hairs, uniseriate, 2 to 4 celled, up to 300 microns in length, many terminating in a pluricellular gland; in the mesophyll, single prismatic crystals, twin crystals or cluster crystals of calcium oxalate. Branches, subcylindrical and densely glandular; hairy; the flowers and bracts in compact flattened masses. Corolla, yellowish, with a network of purplish veins; slightly zygomorphic. Odour, strong and characteristic; taste, bitter and slightly acrid.

Tests for Purity. *Ash,* not more than 20 per cent.; *acid-insoluble ash,* not more than 12 per cent.

Assay. Weigh accurately about 40 grammes in *No. 60 powder,* transfer to a flask, and add 200 millilitres of a mixture of 4 volumes of *ether* and 1 volume of *alcohol* (*95 per cent.*). Shake well, set aside for ten minutes, add 6 millilitres of *dilute solution of ammonia,* and shake frequently during one hour. Transfer the mixture to a percolator plugged with cotton wool, and, when the liquid ceases to flow, pack firmly and continue the percolation, first with 100 millilitres of a similar mixture of *ether* and *alcohol* (*95 per cent.*), and then with *ether,* until *complete extraction* of the alkaloids is effected. The total time of percolation should not exceed two hours. To the percolate add 80 millilitres of *N/2 hydrochloric acid,* shake well, allow to separate, and run off the lower layer. Continue the extraction, using 20 millilitres of a mixture of 3 volumes of *N/10 hydrochloric acid* and 1 volume of *alcohol* (*95 per cent.*), and repeat the process, until *complete extraction* of the alkaloids is effected. Mix the acid liquids, neutralise with *dilute solution of ammonia,* using *litmus* as indicator, and evaporate in vacuo to about 50 millilitres at a temperature not exceeding 40°. Transfer to a separator with 20 millilitres of *N/10 hydrochloric acid* and 20 millilitres of *chloroform.* Shake, allow to separate, and run the chloroform solution into a second separator, containing 20 millilitres of *N/10 hydrochloric acid,* shake this, allow to separate, and reject the chloroform. Continue the extraction of the liquid in the first separator with two further quantities of 10 millilitres each of *chloroform,* transferring the chloroform solution each time to the second separator, washing it with the same aqueous acid liquid as before, and rejecting it. Transfer the acid washings from the second separator to the first separator, add excess of *dilute solution of ammonia*, and shake with successive quantities of about 25 millilitres of *chloroform*, until *complete extraction* of the alkaloids is effected, washing each chloroform solution with the same 20 millilitres of *water* contained in another separator. Evaporate the chloroform, add to the residue 3 millilitres of *alcohol* (*95 per cent.*), evaporate, and dry at 80° for two hours. Dissolve the residue in 10 millilitres of *N/50 sulphuric acid*, and titrate with *N/50 sodium hydroxide*, using *solution of methyl red*, or *tincture of cochineal*, as indicator. Each millilitre of *N/50 sulphuric acid* is equivalent to 0·005784 gramme of alkaloids, calculated as hyoscyamine.

Storage. Hyoscyamus should be stored in a dry place.

Preparations. Extractum Hyoscyami Liquidum.
Tinctura Hyoscyami.
Extractum Hyoscyami Siccum.

DOSES

Metric.	**Imperial.**
0·2 to 0·4 gramme.	**3 to 6 grains.**

ICHTHAMMOL

[Ichtham.]

Ichthammol

Synonym. Ammonium Ichthosulphonate.

Ichthammol consists of the ammonium salts of the sulphonic acids of an oily substance, prepared from a bituminous schist, together with ammonium sulphate and water. It contains not less than 10·5 per cent. w/w of organically combined sulphur, calculated with reference to the substance dried at 100°, and not more sulphur in the form of sulphates than one-fourth of the total sulphur.

Characters. An almost black, viscid liquid; odour, strong and characteristic.

Soluble in *water*; partly soluble in *alcohol* (*90 per cent.*), and in *ether*; miscible with *glycerin*, and with fixed oils.

Tests for Identity. Warmed with an equal volume of *solution of sodium hydroxide*, it gives off ammonia.

1 gramme dissolves in 50 millilitres of *water*, forming a clear dark-brown solution, from which *hydrochloric acid* precipitates a dark resinous mass.

Tests for Purity. Loses, when dried at 100°, not more than 50 per cent. of its weight.

Moisten 5 grammes with *sulphuric acid*, ignite, again moisten with *sulphuric acid*, and reignite; the residue weighs not more than 0·015 gramme.

Assay. *For organically combined sulphur.* Mix, in a porcelain crucible of about 50 millilitres capacity, about 0·5 gramme, accurately weighed, with 4 grammes of *anhydrous sodium carbonate* and 3 millilitres of *chloroform*; warm and stir, until all the chloroform has evaporated. Add 10 grammes of coarsely powdered *copper nitrate*, mix thoroughly, and heat the mixture very gently with a small flame. When the initial reaction has subsided, increase the temperature slightly, until most of the material has blackened. Cool, place the crucible in a large beaker, add 20 millilitres of *hydrochloric acid*, and, when the reaction has ceased, add 100 millilitres of *water*, and boil until all copper oxide is dissolved. Filter the solution, dilute with 400 millilitres of *water*, heat to boiling, and add 20 millilitres of *solution of barium chloride.* Set aside for two hours, filter off the precipitate, wash with *water*, dry, and ignite. Each gramme of the residue is equivalent to 0·1373 gramme of S.

From the percentage of total sulphur thus obtained, subtract the percentage of sulphur in the form of sulphates.

For sulphur in the form of sulphates. Dissolve 2 grammes in 100 millilitres of *water*, add 2 grammes of *cupric chloride* dissolved in 80 millilitres of *water*, and sufficient *water* to produce 200 millilitres; shake well, and filter. To 100 millilitres of the filtrate, representing 1 gramme of the ichthammol being tested, add 1 millilitre of *hydrochloric acid* and 5 millilitres of *solution of barium chloride*, and heat on a water-bath; filter; wash the precipitate with *water*, dry, and ignite. Each gramme of the residue is equivalent to 0·1373 gramme of sulphur present in the form of sulphates.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

INDICARMINUM

[Indicarmin.]

Indigo Carmine

Synonym. Sodium Indigotindisulphonate.

$C_{16}H_8O_8N_2S_2Na_2$ . . . Mol. Wt. 466·2

Indigo Carmine may be prepared by the action of sulphuric acid on indigotin, neutralisation of the purified indigotindisulphonic acid with sodium carbonate, and precipitation with sodium chloride. The product, thus prepared, usually retains a considerable amount of sodium chloride. It contains not less than 90 per cent. of $C_{16}H_8O_8N_2S_2Na_2$, calculated with reference to the substance dried at 100°.

Characters. A blue powder, or blue granules with a coppery lustre; almost odourless; taste, saline.

Soluble in about 100 parts of *water*; readily soluble in warm *water*; almost insoluble in *alcohol* (*95 per cent.*). It is precipitated from an aqueous solution by *sodium chloride.*

Tests for Identity. An aqueous solution has a deep blue colour, which is discharged by the addition of *nitric acid*, of *solution of bromine*, or of *solution of chlorine*, or by warming with *solution of sodium hydroxide* and *zinc powder.*

The residue, left after incineration, yields the *reactions* characteristic of sodium, and of sulphates.

Tests for Purity. Dissolve 1 gramme in 100 millilitres of *water*, filter, wash, and weigh the insoluble matter; the residue weighs not more than 0·005 gramme (limit of insoluble matter).

Dissolve 1 gramme in 20 millilitres of hot *water*, add 5 grammes of *sodium chloride*, shake, cool, and filter; 10 millilitres of the filtrate, diluted with an equal volume of *water*, requires for neutralisation not more than 0·2 millilitre of *N/10 sodium hydroxide*, or of *N/10 hydrochloric acid*, *solution of methyl red* being used as indicator (limit of acidity, or of alkalinity).

Loses, when dried at 100°, not more than 10 per cent. of its weight.

Moisten 1 gramme, previously dried at 100°, with *sulphuric acid*, ignite, again moisten with *sulphuric acid*, and reignite; the residue weighs not less than 0·3 gramme, and not more than 0·4 gramme.

Arsenic limit, 10 parts per million. *Lead limit*, 20 parts per million.

Assay. Dissolve about 0·2 gramme, accurately weighed, in 10 millilitres of warm *water*, add 10 millilitres of *dilute sulphuric acid*, dilute with 500 millilitres of *water*, and titrate with *N/10 potassium permanganate.* The end point of the titration is indicated by the colour changing from green to pale yellow. Under these conditions each millilitre of *N/10 potassium permanganate* is equivalent to 0·0133 gramme of $C_{16}H_8O_8N_2S_2Na_2$.

DOSES

Metric.	Imperial.
By subcutaneous or intramuscular injection.	
0·05 to 0·1 gramme.	$^3/_4$ to $1^1/_2$ grains.
By intravenous injection.	
0·008 to 0·016 gramme.	$^1/_8$ to $^1/_4$ grain.

INFUSUM AURANTII CONCENTRATUM

[Inf. Aurant. Conc.]

Concentrated Infusion of Orange Peel

Dried Bitter-Orange Peel, cut small	400 grammes
Alcohol (25 per cent.) . .	1350 millilitres

Macerate in a covered vessel for forty-eight hours the Dried Bitter-Orange Peel with 1000 millilitres of the Alcohol (25 per cent.); press out the liquid. To the pressed marc add 350 millilitres of the Alcohol (25 per cent.); macerate for twenty-four hours; press; add the liquid to the product of the first pressing. Set aside for not less than fourteen days; filter.

Alcohol content, 22 to 25 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

Concentrated Infusion of Orange Peel, when diluted with seven times its volume of Distilled Water, yields a preparation which is approximately equivalent in strength, but not in flavour, to Fresh Infusion of Orange Peel, and differs also in containing a small proportion of alcohol.

INFUSUM AURANTII RECENS

[Inf. Aurant. Rec.]

Fresh Infusion of Orange Peel

Dried Bitter-Orange Peel, cut small	50 grammes
Distilled Water, boiling . .	1000 grammes

Infuse in a covered vessel for fifteen minutes, and strain.

DOSES

Metric.	**Imperial.**
15 to 30 mils.	**½ to 1 fluid ounce.**

For dispensing purposes, Fresh Infusion of Orange Peel should be used within twelve hours of its preparation.

When Infusum Aurantii, or Infusion of Orange Peel, is prescribed, fresh infusion not being specified, either Infusum Aurantii Recens, or Infusum Aurantii Concentratum suitably diluted, shall be dispensed.

INFUSUM BUCHU CONCENTRATUM

[Inf. Buchu Conc.]

Concentrated Infusion of Buchu

Buchu, freshly broken . .	400 grammes
Alcohol (25 per cent.) .	a sufficient quantity

Percolate the Buchu with Alcohol (25 per cent.). Reserve the first 750 millilitres of the percolate, and continue the percolation until a further 1000 millilitres has been collected; remove the alcohol from the second percolate; evaporate the residue to a syrupy extract, and dissolve this in the reserved portion. Adjust the volume to 1000 millilitres by the addition of a sufficient quantity of Alcohol (25 per cent.). Set aside for not less than fourteen days; filter.

Alcohol content, 21 to 25 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
4 to 8 mils.	60 to 120 minims.

Concentrated Infusion of Buchu, when diluted with seven times its volume of Distilled Water, yields a preparation which is approximately equivalent in strength, but not in flavour, to Fresh Infusion of Buchu, and differs also in containing a small proportion of alcohol.

INFUSUM BUCHU RECENS

[Inf. Buchu Rec.]

Fresh Infusion of Buchu

Buchu, freshly broken . .	50 grammes
Distilled Water, boiling . .	1000 grammes

Infuse in a covered vessel for fifteen minutes, and strain.

DOSES

Metric.	Imperial.
30 to 60 mils.	1 to 2 fluid ounces.

For dispensing purposes, Fresh Infusion of Buchu should be used within twelve hours of its preparation.

When Infusum Buchu, or Infusion of Buchu, is prescribed, fresh infusion not being specified, either Infusum Buchu Recens, or Infusum Buchu Concentratum suitably diluted, shall be dispensed.

INFUSUM CALUMBÆ CONCENTRATUM

[Inf. Calumb. Conc.]

Concentrated Infusion of Calumba

Calumba, cut small . . .	400 grammes
Alcohol (90 per cent.) . .	250 millilitres
Distilled Water, cold .	a sufficient quantity

Macerate, for one hour with occasional stirring, the Calumba with 1100 millilitres of cold Distilled Water; strain, and reserve the clear liquid. Macerate the marc with 500 millilitres of cold Distilled Water, a second and a third time, for one hour in each case. After the third maceration lightly press the marc. Evaporate to 250 millilitres the products of the second and the third macerations, mixed with the liquid expressed from the marc; mix this with the product of the first maceration; add the Alcohol (90 per cent.); adjust the volume to 1000 millilitres. Set aside for not less than fourteen days; filter.

Alcohol content, 21 to 24 per cent. v/v of ethyl alcohol.

DOSE

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

Concentrated Infusion of Calumba, when diluted with seven times its volume of Distilled Water, yields a preparation which is approximately equivalent in strength, but not in flavour, to Fresh Infusion of Calumba, and differs also in containing a small proportion of alcohol.

INFUSUM CALUMBÆ RECENS

[Inf. Calumb. Rec.]

Fresh Infusion of Calumba

Calumba, cut small . . .	50 grammes
Distilled Water, cold . .	1000 millilitres

Infuse in a covered vessel for half an hour, and strain.

DOSES

Metric.	Imperial.
15 to 30 mils.	1/2 to 1 fluid ounce.

For dispensing purposes, Fresh Infusion of Calumba should be used within twelve hours of its preparation.

When Infusum Calumbæ, or Infusion of Calumba, is prescribed, fresh infusion not being specified, either Infusum Calumbæ Recens, or Infusum Calumbæ Concentratum suitably diluted, shall be dispensed.

INFUSUM CARYOPHYLLI CONCENTRATUM

[Inf. Caryoph. Conc.]

Concentrated Infusion of Clove

Clove, bruised	200 grammes
Alcohol (25 per cent.) . .	1100 millilitres

Macerate, in a covered vessel for forty-eight hours, the Clove with 600 millilitres of the Alcohol (25 per cent.); press out the liquid. To the pressed marc add 500 millilitres of the Alcohol (25 per cent.); macerate for twenty-four hours; press; add the liquid to the product of the first pressing. Set aside for not less than fourteen days; filter.

Alcohol content, 23 to 25 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
2 to 4 mils.	30 to 60 minims.

Concentrated Infusion of Clove, when diluted with seven times its volume of Distilled Water, yields a preparation which is approximately equivalent in strength, but not in flavour, to Fresh Infusion of Clove, and differs also in containing a small proportion of alcohol.

INFUSUM CARYOPHYLLI RECENS

[Inf. Caryoph. Rec.]

Fresh Infusion of Clove

Clove, bruised	25 grammes
Distilled Water, boiling . .	1000 grammes

Infuse in a covered vessel for fifteen minutes, and strain.

DOSES

Metric.	**Imperial.**
15 to 30 mils.	**$^1/_2$ to 1 fluid ounce.**

For dispensing purposes, Fresh Infusion of Clove should be used within twelve hours of its preparation.

When Infusum Caryophylli, or Infusion of Clove, is prescribed, fresh infusion not being specified, either Infusum Caryophylli Recens, or Infusum Caryophylli Concentratum suitably diluted, shall be dispensed.

INFUSUM DIGITALIS RECENS

[Inf. Digit. Rec.]

Fresh Infusion of Digitalis

CAUTION.—In any part of the British Empire in which Fresh Infusion of Digitalis is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Synonyms. Infusum Digitalis : Infusion of Digitalis.

Fresh Infusion of Digitalis is intended to possess 0·05 Unit of activity in 1 millilitre and one-twentieth of the strength of Tincture of Digitalis.

Powdered Digitalis . .	a quantity possessing 50 Units of activity, equivalent to 5 grammes of the *international standard digitalis powder.*
Distilled Water, boiling . .	1000 grammes

Infuse in a covered vessel for fifteen minutes; strain while hot.

DOSES

Metric.	**Imperial.**
6 to 20 mils.	**90 to 300 minims.**
Single Doses	
30 to 120 mils.	**1 to 4 fluid ounces.**

Fresh Infusion of Digitalis is intended to contain in 120 mils, or in 4 fluid ounces, 6 Units of activity.

For dispensing purposes, Fresh Infusion of Digitalis should be used within twelve hours of its preparation.

When Infusum Digitalis, or Infusion of Digitalis, is prescribed, Fresh Infusion of Digitalis shall be dispensed.

INFUSUM GENTIANÆ COMPOSITUM CONCENTRATUM

[Inf. Gent. Co. Conc.]

Concentrated Compound Infusion of Gentian

Gentian, thinly sliced . .	100 grammes
Dried Bitter-Orange Peel, cut small	100 grammes
Lemon Peel, cut small . .	200 grammes
Alcohol (25 per cent.) . .	1200 millilitres

Macerate, in a covered vessel for forty-eight hours, the Gentian, Dried Bitter-Orange Peel, and Lemon Peel with 1000 millilitres of the Alcohol (25 per cent.); press out the liquid. To the pressed marc add 200 millilitres of the Alcohol (25 per cent.); macerate for twenty-four hours; press; add the liquid to the product of the first pressing. Set aside for not less than fourteen days; filter.

Alcohol content, 20 to 24 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
2 to 4 mils.	30 to 60 minims.

Concentrated Compound Infusion of Gentian, when diluted with seven times its volume of Distilled Water, yields a preparation which is approximately equivalent in strength, but not in flavour, to Fresh Compound Infusion of Gentian, and differs also in containing a small proportion of alcohol.

INFUSUM GENTIANÆ COMPOSITUM RECENS

[Inf. Gent. Co. Rec.]

Fresh Compound Infusion of Gentian

Gentian, thinly sliced . .	12·5 grammes
Dried Bitter-Orange Peel, cut small	12·5 grammes
Lemon Peel, cut small . .	25 grammes
Distilled Water, boiling . .	1000 grammes

Infuse in a covered vessel for fifteen minutes, and strain.

DOSES

Metric.	Imperial.
15 to 30 mils.	1/2 to 1 fluid ounce.

For dispensing purposes, Fresh Compound Infusion of Gentian should be used within twelve hours of its preparation.

When Infusum Gentianæ Compositum, or Compound Infusion of Gentian, is prescribed, fresh infusion not being specified, either Infusum Gentianæ Compositum Recens, or Infusum Gentianæ Compositum Concentratum suitably diluted, shall be dispensed.

INFUSUM QUASSIÆ CONCENTRATUM

[Inf. Quass. Conc.]

Concentrated Infusion of Quassia

Quassia, rasped . . .	80 grammes
Alcohol (90 per cent.) . .	250 millilitres
Distilled Water, cold .	a sufficient quantity

Macerate, for one hour with occasional stirring, the Quassia with 650 millilitres of cold Distilled Water; strain, and reserve the clear liquid. Macerate the marc with 500 millilitres of cold Distilled Water, a second and a third time, for one hour in each case. After the third maceration lightly press the marc. Evaporate to 250 millilitres the products of the second and the third macerations, mixed with the liquid expressed from the marc; mix this with the product of the first maceration; add the Alcohol (90 per cent.); adjust the volume to 1000 millilitres. Set aside for not less than fourteen days; filter.

Alcohol content, 21 to 24 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
2 to 4 mils.	30 to 60 minims.

Concentrated Infusion of Quassia, when diluted with seven times its volume of Distilled Water, yields a preparation which is approximately equivalent in strength, but not in flavour, to Fresh Infusion of Quassia, and differs also in containing a small proportion of alcohol.

INFUSUM QUASSIÆ RECENS

[Inf. Quass. Rec.]

Fresh Infusion of Quassia

Quassia, rasped . . .	10 grammes
Distilled Water, cold . .	1000 millilitres

Infuse in a covered vessel for fifteen minutes, and strain.

DOSES

Metric.	**Imperial.**
15 to 30 mils.	**$^{1}/_{2}$ to 1 fluid ounce.**

For dispensing purposes, Fresh Infusion of Quassia should be used within twelve hours of its preparation.

When Infusum Quassiæ, or Infusion of Quassia, is prescribed, fresh infusion not being specified, either Infusum Quassiæ Recens, or Infusum Quassiæ Concentratum suitably diluted, shall be dispensed.

INFUSUM SENEGÆ CONCENTRATUM

[Inf. Seneg. Conc.]

Concentrated Infusion of Senega

Senega, in *coarse powder* . .	400 grammes
Dilute Solution of Ammonia Alcohol (25 per cent.)	of each a sufficient quantity

Percolate the Senega with Alcohol (25 per cent.). Reserve the first 750 millilitres of the percolate, and continue the percolation until a further 1000 millilitres has been collected; remove the alcohol from the second percolate; evaporate the residue to a syrupy extract, and dissolve this in the reserved portion. Gradually add Dilute Solution of Ammonia until the product is faintly alkaline. Adjust the volume to 1000 millilitres by the addition of a sufficient quantity of Alcohol (25 per cent.). Set aside for not less than fourteen days; filter.

Alcohol content, 20 to 24 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

Concentrated Infusion of Senega, when diluted with seven times its volume of Distilled Water, yields a preparation which is approximately equivalent in strength, but not in flavour, to Fresh Infusion of Senega, and differs also in containing a small proportion of alcohol.

INFUSUM SENEGÆ RECENS

[Inf. Seneg. Rec.]

Fresh Infusion of Senega

Senega, in *coarse powder* . .	50 grammes
Distilled Water, boiling . .	1000 grammes

Infuse in a covered vessel for half an hour, and strain.

DOSES

Metric.	**Imperial.**
15 to 30 mils.	**1/2 to 1 fluid ounce.**

For dispensing purposes, Fresh Infusion of Senega should be used within twelve hours of its preparation.

When Infusum Senegæ, or Infusion of Senega, is prescribed, fresh infusion not being specified, either Infusum Senegæ Recens, or Infusum Senegæ Concentratum suitably diluted, shall be dispensed.

INFUSUM SENNÆ CONCENTRATUM

[Inf. Senn. Conc.]

Concentrated Infusion of Senna

Senna Fruit, lightly crushed .	800 grammes
Strong Tincture of Ginger. . .	80 millilitres
Alcohol (20 per cent.) .	a sufficient quantity

Percolate the Senna Fruit with Alcohol (20 per cent.). Reserve the first 700 millilitres of the percolate, and continue the percolation until a further 1000 millilitres has been collected; remove the alcohol from the second percolate; evaporate the residue to a syrupy extract, and dissolve this in the reserved portion. Add the Strong Tincture of Ginger; adjust the volume to 1000 millilitres by the addition of a sufficient quantity of

Alcohol (20 per cent.). Set aside for not less than fourteen days; filter.

Alcohol content, 20 to 24 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
2 to 8 mils.	30 to 120 minims.

Concentrated Infusion of Senna, when diluted with seven times its volume of Distilled Water, yields a preparation which is approximately equivalent in strength, but not in flavour, to Fresh Infusion of Senna, and differs also in containing a small proportion of alcohol.

INFUSUM SENNÆ RECENS

[Inf. Senn. Rec.]

Fresh Infusion of Senna

Senna Fruit	100 grammes
Ginger, sliced	5 grammes
Distilled Water, boiling . .	1000 grammes

Infuse in a covered vessel for fifteen minutes, and strain.

Preparation. Mistura Sennæ Composita.

DOSES

Metric.	Imperial.
15 to 60 mils.	$^1/_2$ to 2 fluid ounces.

For dispensing purposes, Fresh Infusion of Senna should be used within twelve hours of its preparation.

When Infusum Sennæ, or Infusion of Senna, is prescribed, fresh infusion not being specified, either Infusum Sennæ Recens, or Infusum Sennæ Concentratum suitably diluted, shall be dispensed.

INJECTIO BISMUTHI

[Inj. Bism.]

Injection of Bismuth

Precipitated Bismuth, in *very fine powder*	20 grammes
Dextrose	5 grammes
Cresol	0·5 millilitre
Distilled Water, freshly redistilled from glass apparatus, sufficient to produce	100 millilitres

Dissolve the Dextrose and the Cresol in Distilled Water, and make up the volume to 100 millilitres. Sterilise by *heating in an autoclave*, by *Tyndallisation*, or by *filtration*. Place the Precipitated Bismuth in a suitable container and sterilise by *heating in an autoclave*, or by *Tyndallisation*, cool, and add sufficient of the solution of Dextrose and Cresol to produce 100 millilitres. Mix thoroughly, transfer to suitable sterilised containers, and sterilise by *heating in an autoclave*, or by *Tyndallisation*.

DOSES

Metric.	**Imperial.**
By intramuscular injection.	
0·5 to 1 mil.	**8 to 15 minims.**

Injection of Bismuth contains in 1 mil 0·2 gramme, and in 15 minims about 3 grains, of Precipitated Bismuth.

INJECTIO BISMUTHI SALICYLATIS

[Inj. Bism. Salicyl.]

Injection of Bismuth Salicylate

Bismuth Salicylate, in *very fine powder*	10 grammes
Camphor	1 gramme
Phenol	1 gramme
Olive Oil, sufficient to produce	100 millilitres

Heat about 110 millilitres of Olive Oil at 150° for one hour; cool. Dissolve the Camphor and the Phenol in 50 millilitres of the Olive Oil, triturate the Bismuth Salicylate with the solution, and add sufficient of the Olive Oil to produce the required volume. Mix thoroughly. Transfer to suitable sterilised containers, and sterilise by *heating in an autoclave* or by *Tyndallisation*.

DOSES

Metric.	**Imperial.**
By intramuscular injection.	
0·6 to 1·2 mils.	**10 to 20 minims.**

Injection of Bismuth Salicylate contains in 1·2 mils 0·12 gramme, and in 20 minims about 2 grains, of Bismuth Salicylate.

INJECTIO FERRI

[Inj. Ferr.]

Injection of Iron

Solution of Ferric Chloride .	7 millilitres
Citric Acid	2 grammes
Dilute Solution of Ammonia .	of each a sufficient quantity
Distilled Water . . .	
Sterilised Water, sufficient to produce . . .	100 millilitres

Mix 6 millilitres of Dilute Solution of Ammonia with 25 millilitres of Distilled Water, and add very gradually and with constant stirring the Solution of Ferric Chloride, diluted with 35 millilitres of Distilled Water, rinsing the vessel containing it with a further 10 millilitres of Distilled Water, and taking care that the Dilute Solution of Ammonia is finally in slight excess, as indicated by the odour; set aside for two hours, stirring occasionally; filter, and wash the precipitated ferric hydroxide with Distilled Water, until the washings give only a slight *reaction* for chlorides with *solution of silver nitrate.* Dissolve the Citric Acid in 5 millilitres of Distilled Water, warm on a water-bath, and transfer the ferric hydroxide to this solution with the aid of a spatula, washing the spatula and filter free from ferric hydroxide with 10 millilitres of Distilled Water; stir until nearly the whole of the ferric hydroxide has dissolved, and heat at a temperature just below the boiling-point for forty-five minutes. Allow the solution to cool. Add Dilute Solution of Ammonia carefully, until the mixture gives no red colour with *solution of methyl red,* and no red colour with *solution of phenol red,* make up to 100 millilitres with Sterilised Water, and filter. Transfer to suitable containers, and sterilise by *heating in an autoclave,* or by *Tyndallisation.*

Storage. Injection of Iron should be protected from light.

DOSES

Metric.	**Imperial.**
By intramuscular injection.	
1 to 2 mils.	**15 to 30 minims.**

Injection of Iron contains in 2 mils the equivalent of about 0·007 gramme of iron, or of about 0·033 gramme of Iron and Ammonium Citrate, and in 30 minims the equivalent of about 1/10 grain of iron, or of about 1/2 grain of Iron and Ammonium Citrate.

INJECTIO HYDRARGYRI

[Inj. Hydrarg.]

Injection of Mercury

Synonym. Mercurial Cream.

Mercury	10 grammes
Wool Fat	50 grammes
Camphor	10 grammes
Creosote	10 millilitres
Olive Oil	23 millilitres

Heat the Wool Fat and the Olive Oil separately at 150° for one hour. Triturate the Mercury with 10 grammes of the Wool Fat in a sterilised mortar, until metallic globules cease to be visible under a lens magnifying four diameters; then incorporate the remainder of the Wool Fat. Add the Camphor previously dissolved in the Creosote, and then the Olive Oil. Mix thoroughly, and transfer to sterilised containers.

DOSES

Metric.	**Imperial.**
By intramuscular injection.	
0·3 to 0·6 mil.	**5 to 10 minims.**

Injection of Mercury contains in 0·6 mil about 0·06 gramme, and in 10 minims about 1 grain, of Mercury.

INJECTIO HYDRARGYRI SUBCHLORIDI

[Inj. Hydrarg. Subchlor.]

Injection of Mercurous Chloride

Synonym. Calomel Injection.

Mercurous Chloride, in *very fine powder*	5 grammes
Wool Fat	50 grammes
Camphor	10 grammes
Creosote	10 millilitres
Olive Oil	23 millilitres

Heat the Wool Fat and the Olive Oil separately at 150° for one hour; cool. In a sterilised mortar triturate the Mercurous Chloride with a little of the Olive Oil. Add the Wool Fat and the remainder of the Olive Oil, and incorporate the Camphor, previously dissolved in the Creosote. Mix thoroughly, and transfer to sterilised containers.

DOSES

Metric.	**Imperial.**
By intramuscular injection.	
0·6 to 1·2 mils.	**10 to 20 minims.**

Injection of Mercurous Chloride contains in 1·2 mils about 0·06 gramme, and in 20 minims about 1 grain, of Mercurous Chloride.

INJECTIO SODII CHLORIDI ET ACACIÆ

[Inj. Sod. Chlorid. et Acac.]

Injection of Sodium Chloride and Acacia

Sodium Chloride	9 grammes
Acacia, in large complete tears, free from dust	60 grammes
Distilled Water, freshly prepared, sufficient to produce	1000 millilitres

Rapidly rinse the Acacia with a little Distilled Water. Dissolve the washed Acacia and the Sodium Chloride in about 950 millilitres of Distilled Water, and adjust the volume to 1000 millilitres. Heat the solution in an autoclave at 121° to 122° for one hour. When the liquid is cool, strain it through cotton wool, and then filter it through a filter composed of alternate layers of filter paper and linen. Transfer to glass containers, and cover the mouths of the containers so as to exclude bacteria. Sterilise by *heating in an autoclave*, allow to cool, and then close the containers without exposing the contents to contamination.

Characters. A faintly yellow and opalescent solution, free from particles, and from deposited matter.

Injectio

INSULINUM

[Insulin.]

Injection of Insulin (Com Insulin

CAUTION.—In any part of the British Empire in which Insulin is controlled by law, care must be taken that the provisions of such law are duly complied with. (*See page 12.*)

Insulin is a preparation containing in solution the specific antidiabetic principle of the mammalian pancreas, 20, 40, 80 u

It may be prepared by the following method. The pancreas, which must be either fresh or kept frozen from the time of removal from the body, is finely divided. Alcohol (95 per cent.) is then added, until the concentration of ethyl alcohol is about 60 per cent. v/v. The mixture is then filtered, and the filtrate evaporated to small bulk, to which Alcohol (95 per cent.) is again added until the concentration of ethyl alcohol is between 60 and 70 per cent. v/v. A precipitate of inert matter is removed by filtration. To the filtrate Dehydrated Alcohol is added, until the concentration of ethyl alcohol is 95 per cent. v/v. The precipitate, now obtained, is collected and dissolved in water. The active material is separated from this solution either by adjusting the *reaction* of the solution to the iso-electric point (which lies between the limits corresponding to the values *p*H 5 and *p*H 6), or by adding Trinitrophenol. The precipitate, obtained in the former way, is dried and powdered. The precipitate, obtained in the latter way, is dissolved in a solvent, containing 6 volumes of Alcohol (80 per cent.) to 1 volume of Dilute Hydrochloric Acid and 1 volume of Distilled Water. This solution is poured into excess of Acetone, and the resulting precipitate is dried and powdered.

INSULIN IN SOLUTION

Insulin may be obtained in solution by dissolving the necessary quantity of the dry powder, obtained as described above, in Distilled Water acidified to a *reaction* between limits corresponding to the values pH 3 and pH 4, so that the solution contains 20 Units per millilitre. To the acidulated water, used for dissolving the powder, is added a suitable antiseptic in such concentration as will prevent the growth of bacteria at least as effectively as 0·5 per cent. w/v of Phenol. The solution is sterilised by passage through a bacteria-proof filter, [illegible] and distributed into sterilised containers in which it is sealed for issue. If it is distributed into sealed ampoules, each of which contains one dose only, an antiseptic need not be added.

Characters. Colourless liquid, free from turbidity and from matter which deposits on standing.

Tests for Purity. Complies with the *tests for sterility.*

Assay. Determine the potency by the *biological assay of insulin,* and express it in Units per millilitre.

Containers. The containers are either sealed glass ampoules, each of which contains an amount intended to be used as one dose, or glass phials, each containing a larger volume and sealed so as to allow the withdrawal of successive doses on different occasions. The containers comply with the *tests for limit of alkalinity of glass.* The label on each container states the number of Units per millilitre, and the date of manufacture.

Storage. Insulin in Solution should be kept at a temperature freezing which does not rise above 20°. The solution should not be used later than ~~eighteen months~~ 2 years after the date of manufacture. During this period it is stable, provided that the *reaction* lies between the limits pH 3 and pH 4.

Biological

INSULIN IN TABLET FORM

Not Official.

Insulin may be obtained in tablet form by mixing the dry powder, obtained as described above, with a neutral powder, such as Lactose, and compressing the mixture into tablets. The tablets must be sterile, and be packed in sterile containers.

Characters. The tablets are readily and completely soluble in water.

Tests for Purity. When the tablets are transferred aseptically to *sterilised water*, so that 10 Units are present in 1 millilitre, the solution complies with the *tests for sterility.*

Assay. Dissolve the tablets in a sufficient quantity of *water* to produce a solution containing 10 Units in 1 millilitre, and determine the potency by the *biological assay of insulin.*

Containers. The label on the container states the number of Units in each tablet.

DOSES

By subcutaneous injection.

5 to 100 Units.

When Insulin is prescribed, Insulin in solution shall be dispensed, unless Insulin in tablet form is specified, containg 20 I.U. per Ml otherwise specified.

II Injectio. Insu
Cum

IODOFORMUM

[Iodof.]

Iodoform

CHI_3 . . . . . . Mol. Wt. 393·8

Iodoform may be obtained by the action of iodine on acetone in the presence of alkali. It contains not less than 99 per cent. of CHI_3.

Characters. Shining, lemon-yellow, small hexagonal crystals, or powder, somewhat unctuous to the touch. Odour and taste, characteristic, persistent, and disagreeable.

Very slightly soluble in *water*; soluble in 100 parts of *alcohol (90 per cent.)*, in 8 parts of *ether*, in 10 parts of *chloroform*, in 3 parts of *carbon disulphide*, and in volatile oils and fixed oils; sparingly soluble in *benzene.*

Tests for Identity. When warmed with *alcoholic solution of potassium hydroxide*, it dissolves, and when the solution is acidified with *nitric acid*, iodine is liberated.

Tests for Purity. *Melting-point*, 120° to 122°.

Shake 1 gramme with 10 millilitres of *water*, and filter; the filtrate is colourless and not bitter (absence of soluble yellow colouring matters), and gives no precipitate with *solution of silver nitrate* (absence of iodides).

Leaves, on incineration, not more than 0·2 per cent. of residue.

Assay. Dissolve about 0·2 gramme, accurately weighed, in 20 millilitres of *alcohol* (*95 per cent.*), add 30 millilitres of *N/10 silver nitrate* and 10 millilitres of *nitric acid.* Allow to stand overnight, add 150 millilitres of *water,* and titrate with *N/10 ammonium thiocyanate,* using *solution of ferric ammonium sulphate* as indicator. Each millilitre of *N/10 silver nitrate,* precipitated by the iodide formed, is equivalent to 0·01313 gramme of CHI_3.

Storage. Iodoform should be protected from light.

Preparations. Oculentum Iodoformi.
Suppositorium Iodoformi.

DOSES

Metric.	Imperial.
0·03 to 0·2 gramme.	1/2 to 3 grains.

IODOPHTHALEINUM

[Iodophthal.]

Iodophthalein

$C_{20}H_8O_4I_4Na_2,3H_2O$ . . . . Mol. Wt. 919·8

Iodophthalein is the di-sodium salt of tetraiodophenolphthalein, and may be prepared by the iodination of phenolphthalein. It contains not less than 85 per cent. of phthalein. The separated phthalein contains not less than 61 per cent., and not more than 62 per cent., of I.

Characters. A blue or blue-violet, crystalline powder; odourless; taste, saline and astringent.

Soluble in 7 parts of *water*; slightly soluble in *alcohol* (*90 per cent.*).

Tests for Identity. When heated, it darkens in colour and gives off iodine vapours.

An aqueous solution is deep blue and dichroic, and yields a pale cream-coloured precipitate on the addition of an acid.

Test for Purity. 1 gramme dissolves completely in 50 millilitres of freshly boiled and cooled *water,* forming a clear deep blue dichroic solution (limit of free phthalein).

Assay. *For phthalein.* Dissolve 0·5 gramme in 50 millilitres of *water,* and add 20 millilitres of *dilute hydrochloric acid*; separate the precipitate by filtration through paper in a Gooch crucible, wash it with 25 millilitres of *dilute hydrochloric acid,* mixed with 25 millilitres of hot *water*; dry at 110°, and weigh the phthalein.

For iodine. Mix about 0·3 gramme, accurately weighed, of the phthalein, obtained in the Assay for phthalein, with 2 grammes of *anhydrous sodium carbonate*; place in a small crucible, and then fill the crucible completely with *anhydrous sodium carbonate* well pressed down; invert the crucible and contents in a larger crucible, and add sufficient *anhydrous sodium carbonate* to seal the junction of the two crucibles. Heat rapidly and strongly over a Bunsen flame, and continue the heating for twenty minutes; allow to cool, and dissolve the residue in 100 millilitres of hot *water*; filter, and wash the filter with a little *water*. To the cooled solution add *hydrochloric acid* until effervescence ceases, then add an equal volume of *hydrochloric acid*, and titrate with *M/20 potassium iodate*, shaking vigorously, until the dark brown solution which is formed becomes light brown; add 5 millilitres of *chloroform*, and continue the titration until the *chloroform* becomes colourless, and the supernatant liquid is clear yellow. Each millilitre of *M/20 potassium iodate* is equivalent to 0·01269 gramme of I.

Sterilisation of a Solution. A solution of Iodophthalein for injection is sterilised by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass*.

DOSES

Metric.	**Imperial.**
0·04 to 0·06 gramme per kilogramme of body weight up to 5 grammes.	**$^1/_8$ to $^1/_2$ grain per pound of body weight up to 75 grains.**
By intravenous injection.	
up to 3 grammes.	**up to 45 grains.**

IODUM

[Iod.]

Iodine

I . . . . . At. Wt. 126·9

Iodine may be obtained from naturally occurring iodides and iodates. It contains not less than 99·5 per cent. of I.

Characters. Heavy, bluish-black, brittle, rhombic prisms or plates with a metallic lustre; odour, characteristic.

Volatile at ordinary temperatures.

Slightly soluble in *water*; more soluble in *alcohol (90 per cent.)*; soluble in *chloroform*, in *ether*, in *glycerin*, and in *carbon disulphide*; very readily soluble in aqueous solutions of iodides.

Tests for Identity. When gently heated, it gives off violet-coloured vapours, which condense, forming a bluish-black crystalline sublimate.

Gives with *solution of potassium iodide and starch* a deep blue colour, which disappears when the solution is boiled and reappears when it is cooled.

Tests for Purity. Triturate 3·5 grammes thoroughly with 35 millilitres of *water*, filter, and decolourise the filtrate by the addition of a little *zinc powder*. The filtrate complies with the following tests:—

> To 5 millilitres add a few drops of *solution of ferrous sulphate* and 1 millilitre of *solution of sodium hydroxide*; warm gently and acidify with *hydrochloric acid*; no blue colour is produced (limit of cyanogen).
>
> To 25 millilitres add 5 millilitres of *dilute solution of ammonia*, and then 5 millilitres of *solution of silver nitrate* added gradually; filter; dilute the filtrate to 50 millilitres, and acidify with 4 millilitres of *nitric acid*; the opalescence produced is not greater than the standard opalescence in the *limit test for chlorides.*

Leaves, when volatilised on a water-bath, not more than 0·05 per cent. of residue.

Assay. Dissolve 0·5 gramme, accurately weighed, in a solution of 1 gramme of *potassium iodide* in 5 millilitres of *water*. Dilute to 50 millilitres with *water*, and titrate with *N/10 sodium thiosulphate*. Each millilitre of *N/10 sodium thiosulphate* is equivalent to 0·01269 gramme of I.

Storage. Iodine should be kept in a glass-stoppered bottle, or in a glass or earthenware container with a well-waxed bung.

Preparations. Liquor Iodi Fortis.
Liquor Iodi Mitis.
Liquor Iodi Simplex.
Syrupus Ferri Iodidi.

IPECACUANHA

[Ipecac.]

Ipecacuanha

Synonyms. Ipecacuanhæ Radix : Ipecacuanha Root.

Ipecacuanha is the dried root of *Cephaëlis Ipecacuanha* (Brot.) A. Rich. It contains not more than 5 per cent.

of stems, not more than 1 per cent. of other organic matter, and not less than 2 per cent. of the total alkaloids of Ipecacuanha, calculated as emetine, of which not less than two-thirds consists of non-phenolic alkaloids, calculated as emetine.

Characters. Somewhat tortuous pieces, seldom more than 15 centimetres long or 6 millimetres thick; from dark brick-red to very dark brown; closely annulated externally, ridges rounded and completely encircling the root; fracture, short, the fractured surface showing a wide greyish bark and a small uniformly dense wood. Bark, consisting of a thin, brown cork layer, and small, thin wedges of phloem extending for a short distance through a thick parenchyma of thin-walled cells, some containing bundles of acicular raphides, but most filled with starch mostly in compound grains with 2 to 8 components, individual starch grains being not more than 15 microns in diameter; wood, consisting mainly of tracheids and lignified medullary rays, many of the elements containing starch grains. Sclerenchymatous cells and bast fibres absent. Odour, slight; taste, bitter.

Test for Purity. *Ash,* not more than 5·5 per cent.

Assay. *For total alkaloids.* Weigh accurately 10 grammes, in *No. 60 powder*, transfer to a flask, and add 100 millilitres of a mixture of 3 volumes of *ether* and 1 volume of *chloroform.* Shake well, and set aside for ten minutes, add 7·5 millilitres of *dilute solution of ammonia,* and shake frequently during one hour. Transfer the mixture to a small percolator, plugged with cotton wool, and, when the liquid ceases to flow, pack firmly and continue the percolation with the mixture of *ether* and *chloroform,* until *complete extraction* of the alkaloids is effected. To the percolate add 20 millilitres of *N/1 sulphuric acid*, shake well, allow to separate, and run off the lower layer. Continue the extraction with successive quantities of a mixture of 3 volumes of *N/10 sulphuric acid* and 1 volume of *alcohol (95 per cent.)*, until *complete extraction* of the alkaloids is effected. Wash the mixed acid liquids with 10 millilitres of *chloroform,* and run off the chloroform into a second separator, containing 20 millilitres of *N/10 sulphuric acid,* shake, allow to separate, and reject the chloroform. Continue the extraction with two further quantities of 5 millilitres each of *chloroform,* transferring each to the second separator, and washing with the same acid aqueous liquid as before. Transfer the acid liquid from the second separator to the first separator, make distinctly alkaline with *dilute solution of ammonia,* and shake with successive quantities of *chloroform,* until *complete extraction* of the alkaloids is effected, washing each chloroform solution with the same 10 millilitres of *water* contained in a second separator. Remove the chloroform, add to the residue 2 millilitres of *alcohol* (*95 per cent.*), evaporate, and dry for about five minutes at 100°. Dissolve the alkaloids in 15 millilitres of *N/10 sulphuric acid,* and titrate with *N/10 sodium hydroxide,* using *solution of methyl red,* or *tincture of cochineal,* as indicator. Each millilitre of *N/10 sulphuric acid* is equivalent to 0·0240 gramme of total alkaloids, calculated as emetine.

For non-phenolic alkaloids. Transfer to a separator the titration liquid, obtained in the Assay for total alkaloids, and add 5 millilitres of *solution of sodium hydroxide* and 50 millilitres of *ether.* Shake, separate the ethereal solution, and shake it with further portions of 10 millilitres and 5 millilitres of *N/1 sodium hydroxide.* Mix the alkaline liquids, and shake them with two further quantities of 15 millilitres each of *ether.* Mix the ethereal solutions, wash with successive quantities of about 5 millilitres of *water* until free from alkali, washing each of the aqueous liquids with the same 10 millilitres of *ether,* contained in a second separator. Evaporate the ethereal liquids, dissolve the residue in 10 millilitres of *N/10 sulphuric acid,* and titrate with *N/10 sodium hydroxide,* using *solution of methyl red,* or *tincture of cochineal,* as indicator. Each millilitre of *N/10 sulphuric acid* is equivalent to 0·0240 gramme of non-phenolic alkaloids, calculated as emetine.

Preparations. Extractum Ipecacuanhæ Liquidum.
Tinctura Ipecacuanhæ.
Ipecacuanha Pulverata.
Pulvis Ipecacuanhæ et Opii.
Trochiscus Morphinæ et Ipecacuanhæ.

When Ipecacuanha is prescribed, Ipecacuanha Pulverata shall be dispensed.

IPECACUANHA PULVERATA

[Ipecac. Pulverat.]

Powdered Ipecacuanha

Synonyms. Powdered Ipecacuanha Root : Pulvis Ipecacuanhæ.

Powdered Ipecacuanha is Ipecacuanha, reduced to a *fine powder* and adjusted, if necessary, either by the admixture in suitable proportions of powdered ipecacuanha, having lower or higher alkaloidal content, or by the addition of powdered Lactose, to contain 2 per cent. of the total alkaloids of

Ipecacuanha, calculated as emetine (limits, 1·9 to 2·1), of which not less than two-thirds consists of non-phenolic alkaloids, calculated as emetine.

Test for Purity. *Ash,* not more than 5·5 per cent.

Assay. Carry out the Assay as directed under 'Ipecacuanha', using 10 grammes.

Storage. Powdered Ipecacuanha should be kept in a well-closed container.

Preparations. Pulvis Ipecacuanhæ et Opii.
Trochiscus Morphinæ et Ipecacuanhæ.

DOSES

Metric.	**Imperial.**
0·03 to 0·12 gramme.	**$^{1}/_{2}$ to 2 grains.**
Emetic Doses	
1 to 2 grammes.	**15 to 30 grains.**

Powdered Ipecacuanha contains in 0·12 gramme 0·0024 gramme, and in 2 grains about $^{1}/_{25}$ grain, of the total alkaloids of Ipecacuanha, calculated as emetine.

IPOMŒA

[Ipom.]

Ipomœa

Synonyms. Ipomœæ Radix : Orizaba Jalap Root : Mexican Scammony Root.

Ipomœa is the dried root of *Ipomœa orizabensis* (Pellet.) Ledanois. It yields, when extracted with Alcohol (90 per cent.), a resin which has the properties described under 'Scammoniæ Resina'.

Characters. Irregular, tough, or fibrous pieces of varying size and shape, but often in portions, 3 to 5 centimetres wide and 2 to 4 centimetres thick, which are transverse or oblique slices of large roots; externally dark, greyish-brown, and wrinkled; internally, greyish or brownish; from the transverse surfaces coarse fibrous strands protrude in irregular concentric circles. Odour, slight; taste, faintly acrid.

Preparation. Scammoniæ Resina.

DOSES

Metric.	**Imperial.**
0·3 to 1·2 grammes	**5 to 20 grains.**

JALAPA

[Jalap.]

Jalap

Jalap consists of the dried tubercles of *Ipomœa purga* Hayne. It contains not more than 2 per cent. of other organic matter, and not less than 9 per cent. of resin.

Characters. Dark brown tubercles, irregularly oblong, napiform or fusiform, 3 to 15 centimetres long, the larger often cut into pieces or partly divided by longitudinal incisions; hard, compact, heavy; externally, wrinkled and marked with small transverse lenticels; internally, yellowish-grey to dingy brown. The transversely cut surface shows a narrow external covering of cork, beneath which is a narrow band of phloem and a cambium line forming a complete brown circle; the central region contains numerous vascular strands formed by meristems appearing as dark coloured lines arranged in indefinite concentric circles or arcs. Cork, composed of thin-walled cells; vessels of the xylem with numerous bordered pits; parenchyma, abundant, thin-walled, containing starch in single and compound grains of 2 to 6 components, individual grains being from 3 to 40, mostly about 30, microns in diameter and sometimes more or less gelatinised; phloem, containing in all parts numerous secretion cells arranged in longitudinal rows and with yellowish-brown resinous contents which stain yellow with *solution of iodine*, and red with *tincture of alkanna*; many cells containing cluster crystals of calcium oxalate, 10 to 35 microns in diameter. Odour, slight and smoky; taste, somewhat sweet at first, afterwards acrid.

Assay. Weigh accurately about 20 grammes, coarsely powdered; extract for four hours by *continuous extraction* with boiling *alcohol (90 per cent.)*; remove most of the alcohol, transfer the residue to a dish with a stirring-rod, both tared, and complete the evaporation; wash the residue with 10 millilitres of boiling *water* by stirring on a water-bath for four or five minutes, pour off the water, and repeat the washing with three further quantities of 10 millilitres of boiling *water*. Dry the residual resin at 100°, and weigh.

Preparation. Jalapa Pulverata.
Pulvis Jalapæ Compositus.

When Jalapa is prescribed, Jalapa Pulverata shall be dispensed.

JALAPA PULVERATA

[Jalap. Pulverat.]

Powdered Jalap

Synonym. Pulvis Jalapæ.

Powdered Jalap is Jalap, reduced to a *fine powder* and adjusted, if necessary, either by the admixture in suitable proportions of powdered exhausted Jalap, or by the addition of powdered Lactose, to contain 10 per cent. of resin (limits, 9 to 11).

Test for Purity. *Ash,* not more than 6·5 per cent.

Assay. Carry out the Assay as directed under 'Jalapa', using about 20 grammes, accurately weighed.

Storage. Powdered Jalap should be kept in a well-closed container.

Preparation. Pulvis Jalapæ Compositus.

DOSES

Metric.	**Imperial.**
0·3 to 1·2 grammes.	**5 to 20 grains.**

KAOLINUM

[Kaolin.]

Kaolin

Kaolin is a native aluminium silicate, powdered and freed from gritty particles by elutriation.

Characters. A soft whitish powder.

Insoluble in *water*, and in mineral acids.

Tests for Identity. Fuse 1 gramme with 2 grammes of *anhydrous sodium carbonate,* digest the residue with *water*, and filter; acidify the filtrate with *hydrochloric acid,* evaporate to dryness, and digest the residue with *dilute hydrochloric acid*; a residue of silica is obtained, and the acid solution yields the *reactions* characteristic of aluminium.

Tests for Purity. Boil 1 gramme with 50 millilitres of *N/5 hydrochloric acid* for five minutes, filter, and evaporate the filtrate; the residue, after ignition, weighs not more than 0·01 gramme (limit of soluble matter).

Boil 1 gramme with 20 millilitres of *water* for five minutes, and filter; the filtrate complies with the *limit test for chlorides.*

Arsenic limit, 2 parts per million. *Lead limit,* 5 parts per million.

Loses, on ignition at a red heat, not more than 15 per cent. of its weight.

Preparation. Cataplasma Kaolini.

DOSES

Metric.	**Imperial.**
15 to 60 grammes.	**$^1/_2$ to 2 ounces.**

KRAMERIA

[Kramer.]

Krameria

Synonyms. Krameriæ Radix : Krameria Root : Rhatany Root.

Krameria is the dried root of *Krameria triandra* Ruiz and Pav., known in commerce as Peruvian Rhatany. It contains not more than 2 per cent. of other organic matter.

Characters. Nearly cylindrical, slightly flexuous, reddish-brown, not more than 15 millimetres thick; cork, scaly and consisting of polygonal cells with dark brown walls; fracture, shortly fibrous in the bark and splintery in the wood; bark, bright reddish-brown, about one-third of the radius of the root in thickness; phloem fibres, flattened in transverse section with non-lignified walls, accompanied by parenchymatous cells containing either prismatic crystals of calcium oxalate 10 to 100 microns in length, or starch grains which are simple or compound, individual grains being rounded, pear-shaped, or with one or more flat faces and up to 40 microns in diameter; wood, pale reddish-brown, finely radiate in transverse section, consisting mainly of wood fibres with some pitted vessels. Odourless; taste of bark, astringent; wood, nearly tasteless.

Test for Purity. *Ash,* not more than 6 per cent.

Preparations. Extractum Krameriæ Siccum.
Trochiscus Krameriæ.
Trochiscus Krameriæ et Cocainæ.
Tinctura Krameriæ.

DOSES

Metric.	**Imperial.**
0·6 to 2 grammes.	**10 to 30 grains.**

LACTOSUM

[Lactos.]

Lactose

Synonyms. Saccharum Lactis : Milk Sugar.

$C_{12}H_{22}O_{11},H_2O$ . . . Mol. Wt. 360·2

Lactose may be obtained from the whey of milk.

Characters. A white, crystalline powder; odourless; taste, slightly sweet.

Soluble in 7 parts of *water*; more soluble in hot *water*; almost insoluble in *alcohol* (*90 per cent.*).

Tests for Identity and Purity. When heated, it melts, swells up and burns, giving off an odour of burnt sugar and leaving a bulky carbonaceous residue.

Heated with *solution of potassio-cupric tartrate*, it produces a copious precipitate of cuprous oxide.

Specific rotation at 20° in a 10 per cent. w/v boiled solution, not less than + 52°, and not more than + 52·6°.

Shake 5 grammes with 20 millilitres of *alcohol* (*90 per cent.*) for ten minutes, and filter; the filtrate, evaporated to dryness, leaves not more than 0·005 gramme of residue (limit of more soluble sugars).

Dissolve 5 grammes in 40 millilitres of *water*, add 1 millilitre of *dilute hydrochloric acid* and 10 millilitres of *solution of hydrogen sulphide*; no colour is produced (limit of copper).

5 grammes, dissolved in 50 millilitres of freshly boiled *water*, requires for neutralisation not more than 0·5 millilitre of *N/10 sodium hydroxide*, *solution of phenolphthalein* being used as indicator (limit of acidity).

Arsenic limit, 1 part per million. *Lead limit*, 2 parts per million.

Leaves, on incineration, not more than 0·1 per cent. of residue.

LÆVULOSUM

[Lævulos.]

Lævulose

Synonym. Fructose.

Lævulose may be prepared from invert sugar, or from honey. It consists chiefly of lævulose, $C_6H_{12}O_6$ (Mol. Wt. 180·1), together with small quantities of dextrose and water.

Characters. A white or cream coloured, hygroscopic, crystalline powder; odourless; taste, sweet.

Very soluble in *water*; less soluble in *alcohol* (*90 per cent.*).

Tests for Identity. When heated, it melts, swells up and burns, giving off an odour of burnt sugar and leaving a bulky carbonaceous residue.

Heated with *solution of potassio-cupric tartrate*, it produces a copious precipitate of cuprous oxide.

Tests for Purity. *Specific rotation* in a well-boiled 10 per cent. w/v aqueous solution at 20° and calculated with reference to the material dried at 105°, not less than − 81°.

Arsenic limit, 2 parts per million. *Lead limit*, 2 parts per million.

Loses, when dried at 105°, not more than 5 per cent. of its weight.

Moisten 2 grammes with *sulphuric acid*, ignite gently, again moisten with *sulphuric acid*, and reignite; the residue weighs not more than 0·05 gramme.

LAMELLÆ

Lamellæ

GENERAL PROCESS

Gelatin, cut small . . .	18 grammes
Glycerin	2 grammes
Distilled Water . . .	88 grammes or a sufficient quantity

Mix the Glycerin with the Distilled Water; allow the Gelatin to soak in the mixture until soft, and then dissolve with the aid of gentle heat; adjust the weight, if necessary, to 100 grammes by the addition of Distilled Water; cool the basis so produced.

Take the prescribed quantity of the above basis; melt it with the aid of gentle heat, add the prescribed quantity of drug, dissolve it and mix. Pour the melted and medicated basis upon a sheet of plate glass 10 centimetres square, previously thinly coated with White Beeswax, in such a manner that the solution is evenly distributed. Dry at a temperature not exceeding 36°; separate the gelatin film, and from this cut discs 3·175 millimetres (⅛ inch) in diameter.

LAMELLA ATROPINÆ

[Lamell. Atrop.]

Lamella of Atropine

Lamella of Atropine is a disc of the basis, weighing about 0·0013 gramme ($\frac{1}{50}$ grain), and containing 0·000013 gramme (0·013 milligramme, $\frac{1}{5000}$ grain) of Atropine Sulphate.

Prepare by the General Process, employing 0·0164 gramme of Atropine Sulphate and 8·8 grammes of basis.

LAMELLA COCAINÆ

[Lamell. Cocain.]

Lamella of Cocaine

Lamella of Cocaine is a disc of the basis, weighing about 0·0035 gramme ($\frac{1}{20}$ grain), and containing 0·0013 gramme (1·3 milligramme, $\frac{1}{50}$ grain) of Cocaine Hydrochloride.

Prepare by the General Process, employing 1·642 grammes of Cocaine Hydrochloride and 15 grammes of basis.

LAMELLA HOMATROPINÆ

[Lamell. Homatrop.]

Lamella of Homatropine

Lamella of Homatropine is a disc of the basis, weighing about 0·0021 gramme ($\frac{1}{32}$ grain), and containing 0·00065 gramme (0·65 milligramme, $\frac{1}{100}$ grain) of Homatropine Hydrobromide.

Prepare by the General Process, employing 0·821 gramme of Homatropine Hydrobromide and 9·9 grammes of basis.

LAMELLA PHYSOSTIGMINÆ

[Lamell. Physostig.]

Lamella of Physostigmine

Synonym. Lamella of Eserine.

Lamella of Physostigmine is a disc of the basis, weighing about 0·0013 gramme ($\frac{1}{50}$ grain), and containing 0·000065 gramme (0·065 milligramme, $\frac{1}{1000}$ grain) of Physostigmine Salicylate.

Prepare by the General Process, employing 0·082 gramme of Physostigmine Salicylate and 8·45 grammes of basis.

LIMONIS CORTEX

[Limon. Cort.]

Lemon Peel

Lemon Peel is the outer part of the fresh pericarp of *Citrus Limonia* Osbeck.

Characters. Outer surface, pale yellow and more or less rough; with only a small amount of the white spongy part of the pericarp on the inner surface; numerous large oil-glands and numerous crystals of calcium oxalate below the epidermis. Odour, strong, fragrant and characteristic; taste, aromatic and bitter.

Preparations. Syrupus Limonis.
Tinctura Limonis.

LINIMENTUM ACONITI

[Lin. Aconit.]

Liniment of Aconite

Aconite, in *moderately coarse powder*	500 grammes
Camphor	30 grammes
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Exhaust the Aconite with Alcohol (90 per cent.) by percolation. Reserve the first 750 millilitres of the percolate; evaporate the remainder to a syrupy consistence, and add it to the reserved portion. Dissolve the Camphor in the mixture, and add a sufficient quantity of Alcohol

(90 per cent.) to produce the required volume. Set aside for not less than twenty-four hours; filter.

Alcohol content, 75 to 85 per cent. v/v of ethyl alcohol.

In making Liniment of Aconite the Alcohol (90 per cent.) may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

LINIMENTUM BELLADONNÆ

[Lin. Bellad.]

Liniment of Belladonna

Liniment of Belladonna contains 0·375 per cent. w/v of the alkaloids of Belladonna Root, calculated as hyoscyamine (limits, 0·350 to 0·400).

Belladonna Root, in *moderately coarse powder* . . .	1000 grammes
Camphor	of each a sufficient quantity
Alcohol (90 per cent.) . .	
Distilled Water . . .	

Exhaust the Belladonna Root with a mixture of 7 volumes of Alcohol (90 per cent.) and 1 volume of Distilled Water by percolation. Reserve the first 800 millilitres of the percolate; evaporate the remainder to a syrupy consistence, and add it to the reserved portion. Determine the proportion of alkaloids contained in this liquid by the Assay described below. Add to the remainder of the liquid a sufficient quantity of Camphor and of the mixture of Alcohol (90 per cent.) and Distilled Water to produce a Liniment of Belladonna, containing 0·375 per cent. w/v of the alkaloids of Belladonna Root, calculated as hyoscyamine, and 5 per cent. w/v of Camphor. Set aside for not less than twenty-four hours; filter.

In making Liniment of Belladonna the Alcohol (90 per cent.) may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

Assay. Introduce 20 millilitres into a separator, containing 25 millilitres of *water,* 20 millilitres of *N/5 sulphuric acid,* and 20 millilitres of *chloroform.* Shake well, allow to separate, and transfer the chloroform solution to another separator; repeat the extraction with two further quantities each of 10 millilitres of *chloroform.* Wash the mixed chloroform solutions with 10 millilitres of *N/5 sulphuric acid*, and add this acid solution to the first aqueous acid liquid. Complete the Assay as directed under 'Belladonnæ Folium', commencing with the words 'make distinctly alkaline with *dilute solution of ammonia. . .*'.

Alcohol content, 70 to 75 per cent. v/v of ethyl alcohol.

LINIMENTUM CAMPHORÆ

[Lin. Camph.]

Liniment of Camphor

Synonym. Camphorated Oil.

Liniment of Camphor contains 20 per cent. w/w of Camphor (limits, 19 to 21).

Camphor	200 grammes
Olive Oil	800 grammes

Dissolve the Camphor in the Olive Oil in a closed vessel.

Assay. Heat about 2 grammes, accurately weighed, in a flat porcelain or glass dish of about 75 millimetres diameter on a water-bath, until the odour of camphor is no longer discernible. Cool in a desiccator, weigh, and calculate the loss in weight as camphor.

Storage. Liniment of Camphor should be kept in a well-closed container, and stored in a cool place.

LINIMENTUM CAMPHORÆ AMMONIATUM

[Lin. Camph. Ammon.]

Ammoniated Liniment of Camphor

Camphor	125 grammes
Oil of Lavender . . .	5 millilitres
Strong Solution of Ammonia .	250 millilitres
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Dissolve the Camphor and Oil of Lavender in 600 millilitres of Alcohol (90 per cent.); add the Strong Solution of Ammonia gradually, shaking frequently; finally add sufficient Alcohol (90 per cent.) to produce the required volume.

Alcohol content, 54 to 58 per cent. v/v of ethyl alcohol.

In making Ammoniated Liniment of Camphor the Alcohol (90 per cent.) may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

LINIMENTUM SAPONIS

[Lin. Sap.]

Liniment of Soap

Soft Soap	80 grammes
Camphor	40 grammes
Oil of Rosemary	15 millilitres
Distilled Water	170 millilitres
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Dissolve the Soap, Camphor, and Oil of Rosemary in 600 millilitres of Alcohol (90 per cent.); add the Distilled Water and sufficient Alcohol (90 per cent.) to produce the required volume; set aside for a week, and filter.

Alcohol content, 61 to 65 per cent. v/v of ethyl alcohol.

In making Liniment of Soap the Alcohol (90 per cent.) may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

LINIMENTUM TEREBINTHINÆ

[Lin. Terebinth.]

Liniment of Turpentine

Soft Soap	75 grammes
Camphor	50 grammes
Oil of Turpentine	650 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Mix the Soft Soap with 100 millilitres of Distilled Water; dissolve the Camphor in the Oil of Turpentine; gradually add the Camphor solution to the Soap mixture, triturating until a thick creamy emulsion is formed; add sufficient Distilled Water to produce the required volume.

LINIMENTUM TEREBINTHINÆ ACETICUM

[Lin. Terebinth. Acet.]

Acetic Liniment of Turpentine

Synonym. Liniment of Turpentine and Acetic Acid.

Glacial Acetic Acid . . .	110 millilitres
Liniment of Camphor . .	445 millilitres
Oil of Turpentine, sufficient to produce	1000 millilitres

Mix.

LINUM

[Linum]

Linseed

Synonym. Lini Semina.

Linseed consists of the dried ripe seeds of *Linum usitatissimum* Linn. It contains not more than 2 per cent. of other organic matter.

Characters. Small, brown, glossy, nearly flat seeds; about 4 to 6 millimetres in length and about 2 to 2·5 millimetres in maximum width; ovate and obliquely pointed; surface, glabrous and minutely pitted. Internally, yellowish-white, with thin endosperm and two large oily cotyledons. In the testa, isodiametric epidermal cells having mucilaginous outer walls, a middle parenchymatous layer, sclerenchyma of narrow longitudinally elongated cells with thick lignified pitted walls, and a layer of pigment cells with reddish-brown contents. In the cotyledons, aleurone grains up to 20 microns in diameter with globoid and crystalloid. Odourless; taste, mucilaginous and oily.

LINUM CONTUSUM

[Linum Contus.]

Crushed Linseed

Synonyms. Lini Semina Contusa: Linseed Meal.

Crushed Linseed is Linseed, coarsely powdered. It should be recently prepared.

Characters. A brownish-yellow powder, with readily visible fragments of the brown testa; odour, bland, and not pungent or rancid, when the powder is mixed with warm water.

Tests for Purity. *Ash,* not more than 5 per cent.

Yields, on *continuous extraction* with *ether,* not less than 30 per cent. of fixed oil, having the characters and properties described under 'Oleum Lini'. The residual powder, examined under the microscope, exhibits only an occasional starch grain.

LIQUOR ADRENALINÆ HYDROCHLORIDI

[Liq. Adrenal. Hydrochlor.]

Solution of Adrenaline Hydrochloride

Synonyms. Liquor Adrenalini Hydrochloricus: Hydrochloric Solution of Adrenalin.

Adrenaline	1 gramme
Chlorbutol	5 grammes
Sodium Chloride	9 grammes
Dilute Hydrochloric Acid . .	3 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Dissolve the Chlorbutol and the Sodium Chloride in 900 millilitres of boiling Distilled Water, cool, add the Dilute Hydrochloric Acid, dissolve the Adrenaline in the mixture, and add sufficient Distilled Water, recently boiled and cooled, to produce the required volume. Sterilise by heating in a closed container at 80° for one hour.

The containers used comply with the tests for *limit of alkalinity of glass.*

Storage. Solution of Adrenaline Hydrochloride should be kept in a well-filled, well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
By subcutaneous injection.	
0·12 to 0·5 mil.	2 to 8 minims.

LIQUOR AMMONIÆ DILUTUS

[Liq. Ammon. Dil.]

Dilute Solution of Ammonia

Synonyms. Liquor Ammoniæ: Solution of Ammonia.

Dilute Solution of Ammonia is an aqueous solution, containing 10 per cent. w/w of NH_3 (limits, 9·5 to 10·5).

Strong Solution of Ammonia .	333 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Mix.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·958 to 0·9615.

Mix 15 millilitres with 6 grammes of powdered *citric acid* in a small flask, and rotate until dissolved; no tarry odour is perceptible (limit of tarry matter).

Arsenic limit, 0·16 part per million. *Lead limit,* 0·3 part per million.

Leaves, when evaporated to dryness on a water-bath, not more than 0·005 per cent. w/v of residue.

Assay. Carry out the Assay as described under 'Liquor Ammoniæ Fortis', using about 6 grammes, accurately weighed.

Storage. Dilute Solution of Ammonia should be kept in a well-closed container, and stored in a cool place.

DOSES

Metric.	Imperial.
0·6 to 1·2 mils.	10 to 20 minims.

LIQUOR AMMONIÆ FORTIS

[Liq. Ammon. Fort.]

Strong Solution of Ammonia

Strong Solution of Ammonia may be prepared by heating a mixture of ammonium chloride and slaked lime, and by passing the resulting ammonia into water. It contains 32·5 per cent. w/w of NH_3 (limits, 31·5 to 33·5).

Characters. A clear, colourless liquid; odour, strongly pungent and characteristic.

Miscible with *water* in all proportions.

Tests for Identity. Strongly alkaline, even when freely diluted. Produces dense white fumes when the vapour is brought into contact with *gaseous hydrochloric acid.*

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·885 to 0·891.

Dilute 5 millilitres with 10 millilitres of *water*, mix with 6 grammes of powdered *citric acid* in a small flask, and rotate until dissolved; no tarry odour is perceptible (limit of tarry matter).

Arsenic limit, 0·5 part per million. *Lead limit*, 1 part per million.

Leaves, when evaporated to dryness on a water-bath, not more than 0·01 per cent. w/v of residue.

Assay. Weigh accurately about 2 grammes into a flask containing 50 millilitres of *N/1 sulphuric acid*, and titrate the excess of acid with *N/1 sodium hydroxide*, using *solution of methyl red* as indicator. Each millilitre of *N/1 sulphuric acid* is equivalent to 0·01703 gramme of NH_3.

Storage. Strong Solution of Ammonia should be kept in a well-closed container, and stored in a cool place.

Preparations. Liquor Ammoniæ Dilutus.
Spiritus Ammoniæ Aromaticus.

LIQUOR AMMONII ACETATIS DILUTUS

[Liq. Ammon. Acet. Dil.]

Dilute Solution of Ammonium Acetate

Synonyms. Liquor Ammonii Acetatis: Solution of Ammonium Acetate.

Dilute Solution of Ammonium Acetate contains 7·2 per cent. w/v of $C_2H_7O_2N$ (limits, 6·9 to 7·5).

Strong Solution of Ammonium Acetate	125 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Mix.

Tests for Purity. The *reaction* is not less than *p*H 7·0, and not more than *p*H 8·0.

Arsenic limit, 0·5 part per million. *Lead limit*, 0·6 part per million.

Assay. Carry out the Assay described under 'Liquor Ammonii Acetatis Fortis', using 20 millilitres with 6 millilitres of neutralised *solution of formaldehyde*.

Storage. Dilute Solution of Ammonium Acetate should be kept in a bottle of lead-free glass.

DOSES

Metric.	**Imperial.**
8 to 30 mils.	**1/4 to 1 fluid ounce.**

LIQUOR AMMONII ACETATIS FORTIS

[Liq. Ammon. Acet. Fort.]

Strong Solution of Ammonium Acetate

Strong Solution of Ammonium Acetate contains 57·5 per cent. w/v of $C_2H_7O_2N$ (limits, 55 to 60).

Glacial Acetic Acid . . .	453 grammes
Ammonium Carbonate . .	330 grammes
Strong Solution of Ammonia .	100 millilitres or a sufficient quantity
Distilled Water, sufficient to produce	1000 millilitres

Mix the Glacial Acetic Acid with 350 millilitres of Distilled Water; add the Ammonium Carbonate in small quantities at a time, until it is all dissolved; then add sufficient of the Strong Solution of Ammonia until one drop of the resulting solution, diluted with ten drops of Distilled Water, gives a full blue colour with one drop of *solution of bromothymol blue*, and a full yellow colour with one drop of *solution of thymol blue*; add sufficient Distilled Water to produce the required volume.

Characters. A thin syrupy liquid with an odour of ammonia, and of acetic acid. *Specific gravity* (15·5°/15·5°), about 1·098.

Tests for Identity. Yields the *reactions* characteristic of ammonium salts, and of acetates.

Tests for Purity. The *reaction* of 1 millilitre, diluted with 10 millilitres of *water*, is not less than *p*H 7·0, and not more than *p*H 8·0.

Arsenic limit, 4 parts per million. *Lead limit*, 5 parts per million.

Assay. Dilute 5 millilitres, accurately measured, with 50 millilitres of *water*, add 12 millilitres of *solution of formaldehyde*, previously neutralised to *phenolphthalein*, and titrate with *N/1 sodium hydroxide*, using *solution of phenolphthalein* as indicator. Each millilitre of *N/1 sodium hydroxide* is equivalent to 0·07706 gramme of $C_2H_7O_2N$.

Storage. Strong Solution of Ammonium Acetate should be kept in a bottle of lead-free glass.

Preparation. Liquor Ammonii Acetatis Dilutus.

DOSES

Metric.	Imperial.
1 to 4 mils.	15 to 60 minims.

LIQUOR ARSENICALIS

[Liq. Arsen.]

Arsenical Solution

Synonyms. Solutio arsenicalis seu Fowleri I.A.: Fowler's solution.

Arsenical Solution contains the equivalent of 1 per cent. w/v of Arsenic Trioxide (limits, 0·95 to 1·05).

Arsenic Trioxide, in powder .	10 grammes
Solution of Potassium Hydroxide	100 millilitres
Dilute Hydrochloric Acid .	28 millilitres or a sufficient quantity
Distilled Water, sufficient to produce	1000 millilitres

Dissolve the Arsenic Trioxide in the Solution of Potassium Hydroxide with the aid of heat; add 500 millilitres of Distilled Water, and then add, with constant agitation, the Dilute Hydrochloric Acid, until the solution is neutral to *litmus.* Add sufficient Distilled Water to produce the required volume.

Characters. A clear colourless liquid; odourless; taste, slightly saline.

Assay. To 20 millilitres add about 3 grammes of *sodium bicarbonate,* and titrate with *N/10 iodine.* Each millilitre of *N/10 iodine* is equivalent to 0·0049475 gramme of As_2O_3.

DOSES

Metric.	Imperial.
0·12 to 0·5 mil.	2 to 8 minims.

Arsenical Solution contains in 0·5 mil the equivalent of 0·005 gramme, and in 8 minims the equivalent of about $^1/_{12}$ grain, of Arsenic Trioxide.

LIQUOR ARSENI ET HYDRARGYRI IODIDI

[Liq. Arsen. et Hydrarg. Iod.]

Solution of Arsenous and Mercuric Iodides

Synonym. Donovan's Solution.

Solution of Arsenous and Mercuric Iodides is an aqueous solution, containing 1 per cent. w/v of Red Mercuric Iodide (limits, 0·95 to 1·05), and total arsenic equivalent to 1 per cent. w/v of Arsenic Triiodide (limits, 0·95 to 1·05).

Arsenic Triiodide . . .	10 grammes
Red Mercuric Iodide . .	10 grammes
Distilled Water, sufficient to produce	1000 millilitres

Triturate the Arsenic Triiodide and Red Mercuric Iodide with 150 millilitres of Distilled Water until dissolved; filter; wash the filter with a little Distilled Water, add the washings to the filtrate together with a sufficient quantity of Distilled Water to produce the required volume. Mix.

Characters. A clear, nearly colourless or pale yellow liquid.

Assay. *For total arsenic.* To 50 millilitres add 1 gramme of *sodium bicarbonate*, and exactly oxidise the arsenic with *N/10 iodine*; to the solution add 45 millilitres of *hydrochloric acid*, set aside for ten minutes, and titrate the liberated iodine with *N/10 sodium thiosulphate.* Each millilitre of *N/10 sodium thiosulphate* is equivalent to 0·02279 gramme of total arsenic, calculated as AsI_3.

For mercury. To 50 millilitres add excess of *dilute solution of ammonia*, and saturate the mixture with *hydrogen sulphide*; filter off the precipitated mercuric sulphide, wash well with *dilute solution of ammonia*, dry at 120°, and weigh. Each gramme of dry precipitate is equivalent to 1·953 grammes of HgI_2.

Storage. The arsenous compound in this solution is rapidly oxidised to the arsenic state, when kept in contact with air. The solution should be freshly prepared, or if not used immediately after preparation, it should be kept in a well-filled container, protected from light.

DOSES

Metric.	Imperial.
0·3 to 1 mil.	5 to 15 minims.

Solution of Arsenous and Mercuric Iodides contains in 1 mil the equivalent of 0·01 gramme, and in 15 minims the equivalent of about 1/7 grain, of each salt.

LIQUOR CALCII HYDROXIDI

[Liq. Calc. Hydrox.]

Solution of Calcium Hydroxide

Synonyms. Liquor Calcis: Solution of Lime: Lime Water.

Solution of Calcium Hydroxide is an aqueous solution, containing at 15·5° not less than 0·15 per cent. w/v of $Ca(OH)_2$.

Calcium Hydroxide . . .	10 grammes
Distilled Water . . .	1000 millilitres

Shake together thoroughly and repeatedly; set aside until clear. The clear Solution may be drawn off with a siphon, as required for use.

Characters. A clear, colourless liquid; taste, alkaline.

It absorbs carbon dioxide from the air, a film of calcium carbonate forming on the surface of the liquid. It becomes turbid when boiled and clear again on cooling.

Tests for Identity. Yields the *reactions* characteristic of calcium. Alkaline to *phenolphthalein.*

Tests for Purity. 70 millilitres evaporated to about 45 millilitres complies with the *limit test for chlorides.*

Arsenic limit, 0·2 part per million. *Lead limit,* 0·5 part per million.

Assay. Titrate 25 millilitres with *N/10 sulphuric acid,* using *solution of phenolphthalein* as indicator. Each millilitre of *N/10 sulphuric acid* is equivalent to 0·003705 gramme of $Ca(OH)_2$.

Storage. Solution of Calcium Hydroxide should be kept in a well-filled, well-closed container.

DOSES

Metric.	**Imperial.**
30 to 120 mils.	**1 to 4 fluid ounces.**

LIQUOR CRESOLIS SAPONATUS

[Liq. Cresol. Sap.]

Solution of Cresol with Soap

Synonym. Lysol.

NOTE.—The use of the name Lysol as a synonym for Solution of Cresol with Soap is limited to Great Britain and Northern Ireland. In parts of the British Empire, in which the word Lysol is a trade-mark, it may be used only when applied to the product made by the owners of the trade-mark.

Solution of Cresol with Soap is a solution of Cresol in a saponaceous solvent. It contains 50 per cent. v/v of Cresol (limits, 47 to 53); it possesses the Characters and complies with the Tests for Purity described below.

The solvent is prepared by the interaction of a fixed vegetable oil, and potassium hydroxide, or sodium hydroxide, or a mixture of these, together with water.

A suitable preparation may be obtained by the following process:—

Cresol	500 millilitres
Linseed Oil	180 grammes
Potassium Hydroxide . .	42 grammes
Distilled Water, sufficient to produce	1000 millilitres

Dissolve the Potassium Hydroxide in 250 millilitres of Distilled Water, add the Linseed Oil, and heat on a water-bath, mixing thoroughly; continue to heat until a small portion dissolves in water without the separation of oily drops, add the Cresol, mix thoroughly, and add sufficient Distilled Water to produce the required volume.

Characters. An amber-coloured to reddish-brown liquid; odour that of cresol; soapy to the touch.

Miscible in all proportions with *water*, with *alcohol* (*95 per cent.*), and with *ether*; not miscible with *acetone*.

Tests for Purity. Mix 5 millilitres with 95 millilitres of *water*; a clear solution is formed, which shows no opalescence on standing for not less than three hours.

Dilute 5 millilitres with 50 millilitres of neutralised *alcohol* (*95 per cent.*), and titrate with *N/1 sulphuric acid*, using *solution of alkali blue* as indicator; not more than 0·3 millilitre is required (limit of alkali).

Complies with the test for limit of sulphur compounds, described under 'Cresol'.

Distil 120 millilitres, until all the water and 50 millilitres of cresol have been collected. The cresol, thus recovered, complies with the tests for limit of hydrocarbons, and for limit of volatile bases, described under 'Cresol'. In making these tests the aqueous portion of the distillate is used instead of an equal volume of *water*.

Assay. Weigh accurately about 250 millilitres into a separator, add 100 millilitres of *ether* and a slight excess of *hydrochloric acid*, shake vigorously, and allow to separate. Transfer the ethereal liquid to a round-bottomed flask; wash the aqueous liquid with a little *ether*, and add the ethereal liquid thus obtained to the contents of the flask. Remove the ether, and distil the residual liquid in steam, the flask being heated in an oil-bath at 170°. After the liquid condensed has ceased to show any opalescence, continue the distillation, until a further 250 millilitres has been collected, and the liquid condensed shows not more than a faint haze with *solution of bromine*. Transfer the distillate to a separator, saturate it with *sodium chloride*, and extract with three successive quantities of 100 millilitres of *ether*. Remove the ether from the mixed ethereal solutions by distillation in a tared flask, heat the residual liquid in an oil-bath at 170° to remove ether and moisture, cool, and weigh the crude cresol. Distil the crude cresol through a Liebig's condenser; collect separately any water which distils, and measure it. Transfer the non-volatile residue, by means of a little *ether*, to a small tared dish, heat rapidly until fumes are given off, cool, and weigh. From the weight of crude cresol, as determined above, subtract the weight of water and non-volatile residue. Determine the *specific gravity* (15·5°/15·5°) of the solution of cresol with soap being assayed, and of the cresol separated from it, and calculate the percentage volume in volume. The separated cresol complies with the requirements for *specific gravity* and *boiling-point* described under 'Cresol'.

LIQUOR EPISPASTICUS

[Liq. Epispast.]

Blistering Liquid

Cantharidin	4 grammes
Castor Oil	25 millilitres
Colophony	12 grammes
Acetone, sufficient to produce .	1000 millilitres

Dissolve.

LIQUOR ERGOSTEROLIS IRRADIATI

[Liq. Ergosterol. Irrad.]

Solution of Irradiated Ergosterol

Solution of Irradiated Ergosterol is a solution in oil of an antirachitic principle, probably identical with the vitamin D contained in Cod-liver Oil. It contains in 1 gramme 3000 *Units of antirachitic activity.*

Solution of Irradiated Ergosterol may be prepared by submitting a solution of purified ergosterol in a suitable solvent to the action of ultraviolet radiations from a mercury-vapour lamp, or from some other suitable source, for a limited period of time; by removing any volatile solvent; and by dissolving the whole product, or the purified antirachitic principle separated from it by an appropriate method, in a sufficient quantity of a suitable vegetable oil, such as Arachis Oil, to produce a solution of the required antirachitic activity.

Assay. Determine the antirachitic activity by the *biological assay of antirachitic vitamin* (*vitamin D*).

Storage. Solution of Irradiated Ergosterol should be kept in a well-closed container, protected from light, and stored in a cool place.

Labelling. The label on the container states the number of Units of antirachitic activity in 1 gramme.

DOSES

Prophylactic doses (daily) for an infant
1000 to 3000 Units
(0·3 to 1 mil, 5 to 15 minims)

Curative doses (daily) for an infant
5000 to 10,000 Units
(1·5 to 3 mils, 25 to 50 minims).

Solution of Irradiated Ergosterol contains in 1 mil about 3000 Units, and in 15 minims about 3000 Units, of antirachitic activity.

LIQUOR FERRI PERCHLORIDI

[Liq. Ferr. Perchlor.]

Solution of Ferric Chloride

Solution of Ferric Chloride is an aqueous solution, containing 15 per cent. w/v of $FeCl_3$ (limits, 14·25 to 15·75). It may be obtained by the oxidation of ferrous chloride, prepared by the interaction of diluted hydrochloric acid and iron.

Tests for Purity. The filtrate obtained in the Assay is devoid of blue colour, and shows neither darkening nor turbidity when saturated with *hydrogen sulphide* (limit of copper, and of zinc).

1 millilitre complies with the *limit test for sulphates.*

Arsenic limit, 2·5 parts per million.

Assay. Dilute 2 millilitres with 50 millilitres of *water*; heat the solution to the boiling-point, and add an excess of *dilute solution of ammonia*; filter off the precipitated ferric hydroxide; wash with *water*, dry, ignite, and weigh the residue. Each gramme of the residue is equivalent to 2·031 grammes of $FeCl_3$.

DOSES

Metric.	**Imperial.**
0·3 to 1 mil.	**5 to 15 minims.**

Solution of Ferric Chloride contains in 1 mil 0·15 gramme of ferric chloride, corresponding to about 0·05 gramme of iron, and in 15 minims about $2^1/_2$ grains of ferric chloride, corresponding to about $^4/_5$ grain of iron.

LIQUOR FORMALDEHYDI

[Liq. Formaldehyd.]

Solution of Formaldehyde

Synonym. Formalin.

NOTE.—The use of the name Formalin as a synonym for Solution of Formaldehyde is limited to Great Britain and Northern Ireland. In parts of the British Empire, in which the word Formalin is a trade-mark, it may be used only when applied to the product made by the owners of the trade-mark.

Solution of Formaldehyde is an aqueous solution of formaldehyde, with a variable amount of ethyl alcohol or methyl alcohol, or both. It contains not less than 37 per cent. w/v, and not more than 41 per cent. w/v, of CH_2O.

Characters. A colourless liquid; odour, characteristic, pungent, and irritating; taste, burning.

Miscible with *water*, and with *alcohol* (*90 per cent.*).

Tests for Identity. Dilute 1 millilitre with a sufficient quantity of *water* to make 1 litre; to 10 millilitres of this solution add 2 millilitres of a freshly prepared 1 per cent. w/v aqueous solution of *phenylhydrazine hydrochloride*, 1 millilitre of *solution of potassium ferricyanide*, and 5 millilitres of *hydrochloric acid*; a brilliant red colour is produced.

Leaves, on evaporation on a water-bath, a white amorphous residue.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·080 to 1·095. Neutral, or slightly acid, to *litmus*.

Assay. Add 3 millilitres to 50 millilitres of *solution of hydrogen peroxide* and 50 millilitres of *N/1 sodium hydroxide*, and warm on a water-bath until effervescence ceases; titrate the excess of alkali with *N/1 sulphuric acid*, using *solution of phenolphthalein* as indicator. Repeat the operation without the solution of formaldehyde. The difference between the two titrations represents the sodium hydroxide required to neutralise the formic acid produced by the oxidation of the formaldehyde. Each millilitre of *N/1 sodium hydroxide* is equivalent to 0·0300 gramme of CH_2O.

Storage. Solution of Formaldehyde should be kept in a well-closed container, and stored in a moderately warm place.

LIQUOR GLYCERYLIS TRINITRATIS

[Liq. Glyc. Trinit.]

Solution of Glyceryl Trinitrate

Synonyms. Solutio nitroglycerini spirituosa I.A.: Liquor Trinitrini: Solution of Trinitrin: Solution of Nitroglycerin: Spiritus Glycerylis Nitratis.

Solution of Glyceryl Trinitrate is a solution of glyceryl trinitrate in Alcohol (90 per cent.), containing 1 per cent. w/v of $C_3H_5(NO_3)_3$ (limits, 0·9 to 1·1). Glyceryl trinitrate may be prepared by the action of a mixture of nitric and sulphuric acids upon glycerin.

Characters. A clear, colourless liquid. Neutral to *litmus*. *Specific gravity* (15·5°/15·5°), 0·836 to 0·841.

Tests for Identity. 10 millilitres, mixed with 20 millilitres of *water*, is turbid, and, on standing, an oily liquid is deposited.

Mix 5 millilitres with 0·5 millilitre of *solution of sodium hydroxide*, set aside for an hour, and add 5 millilitres of *solution of potassium iodide* and 5 millilitres of *dilute sulphuric acid*; iodine is liberated and brown fumes are evolved.

Assay. Mix 5 millilitres in a closed tube with 0·5 millilitre of *solution of sodium hydroxide*. Set aside for one hour, and pour the liquid into a nitrometer filled with *solution of sodium chloride*, rinsing the tube with small quantities of *alcohol (90 per cent.)*. Add 5 millilitres of *solution of potassium iodide* and 5 millilitres of *dilute sulphuric acid*, shake, and measure the volume of nitric oxide produced. Each millilitre of nitric oxide, at 15·5° and normal pressure, is equivalent to 0·00505 gramme of $C_3H_5O_9N_3$.

Alcohol content, 88 to 90 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
0·03 to 0·12 mil.	$^1/_2$ to 2 minims.

Solution of Glyceryl Trinitrate contains in 0·12 mil 0·0012 gramme, and in 2 minims about $^1/_{60}$ grain, of glyceryl trinitrate.

LIQUOR HYDRARGYRI PERCHLORIDI

[Liq. Hydrarg. Perchlor.]

Solution of Mercuric Chloride

Solution of Mercuric Chloride is an aqueous solution, containing 0·1 per cent. w/v of Mercuric Chloride (limits, 0·095 to 0·105).

Mercuric Chloride	1 gramme
Distilled Water, sufficient to produce	1000 millilitres

Dissolve.

Assay. Mix 200 millilitres with 10 millilitres of *solution of potassium iodide,* 5 millilitres of *solution of sodium hydroxide,* and 3 millilitres of *solution of formaldehyde,* and heat at 25° for fifteen minutes. Cool, add 10 millilitres of *acetic acid* and 20 millilitres of *N/10 iodine,* shake continuously for about ten minutes, or until the precipitated mercury is completely redissolved, and titrate the excess of iodine with *N/10 sodium thiosulphate.* Each millilitre of *N/10 iodine* is equivalent to 0·013575 gramme of $HgCl_2$.

Storage. Solution of Mercuric Chloride should be protected from light.

DOSES

Metric.	Imperial.
2 to 4 mils.	30 to 60 minims.

Solution of Mercuric Chloride contains in 4 mils 0·004 gramme, and in 60 minims about $^1/_{16}$ grain, of Mercuric Chloride.

Dissolve the Potassium Iodide and Iodine in the Distilled Water; add sufficient Alcohol (90 per cent.) to produce the required volume.

Assay. *For iodine.* Dilute 10 millilitres with 20 millilitres of *water*, and titrate with *N/10 sodium thiosulphate.* Each millilitre of *N/10 sodium thiosulphate* is equivalent to 0·01269 gramme of I.

For potassium iodide. To 10 millilitres add 20 millilitres of *water* and 40 millilitres of *hydrochloric acid,* and titrate with *M/20 potassium iodate,* shaking vigorously until the dark brown solution becomes only light brown in colour; add 5 millilitres of *chloroform,* and continue the titration until the chloroform becomes colourless, and the supernatant liquid is clear yellow. From the quantity of *M/20 potassium iodate* required, subtract half the quantity of *N/10 sodium thiosulphate* required in the assay for iodine. Each millilitre of *M/20 potassium iodate* is equivalent to 0·0166 gramme of KI.

Alcohol content, 85 to 88 per cent. v/v of ethyl alcohol.

Storage. Weak Solution of Iodine should be kept in a well-closed, glass-stoppered bottle.

DOSES

Metric.	**Imperial.**
0·3 to 2 mils.	**5 to 30 minims.**

Weak Solution of Iodine contains in 2 mils 0·05 gramme of Iodine, and about 0·07 gramme of total iodine, free and combined; and in 30 minims about $^4/_5$ grain of Iodine, and about 1 grain of total iodine, free and combined.

LIQUOR IODI SIMPLEX

[Liq. Iod. Simp.]

Simple Solution of Iodine

Simple Solution of Iodine contains 9 per cent. w/v of total iodine (limits, 8·8 to 9·2), corresponding approximately to 10 per cent. w/w of total iodine.

Iodine	90 grammes
Alcohol (95 per cent.), sufficient to produce	1000 millilitres

Dissolve.

Tests for Purity. 10 millilitres, evaporated on a water-bath and heated until iodine vapours cease to be given off, yields not more than 0·0005 gramme of residue.

Assay. Shake 5 millilitres in a stoppered tube with 0·2 gramme of *zinc powder* and 1 drop of *glacial acetic acid* for two minutes; add a further 0·1 gramme, or a sufficient quantity, of *zinc powder*, and shake until the liquid is colourless; add a small globule of *mercury*, about 0·2 gramme, and again shake. Dilute with 20 millilitres of *water*, decant the solution from the amalgam into a flask, and wash the tube and amalgam with two successive 5 millilitre quantities of *water*. Mix the solution and washings, add 45 millilitres of *hydrochloric acid*, and titrate with *M/20 potassium iodate*, shaking vigorously, until the dark brown solution which is formed becomes only light brown in colour; add 5 millilitres of *chloroform*, and continue the titration until the chloroform becomes colourless and the supernatant liquid is clear yellow. Each millilitre of *M/20 potassium iodate* is equivalent to 0·01269 gramme of I.

Alcohol content, 92 to 94 per cent. v/v of ethyl alcohol.

Storage. Simple Solution of Iodine should be kept in a well-closed bottle, and stored in a cool place. When stored, it is liable to alteration in strength.

DOSES

Metric.	**Imperial.**
0·2 to 1 mil.	**3 to 15 minims.**

Simple Solution of Iodine contains in 1 mil 0·09 gramme, and in 15 minims about $1^1/_2$ grain, of Iodine.

LIQUOR MAGNESII BICARBONATIS

[Liq. Mag. Bicarb.]

Solution of Magnesium Bicarbonate

Synonym. Fluid Magnesia.

Solution of Magnesium Bicarbonate is a solution of magnesium bicarbonate in water, saturated with carbon dioxide, and may be prepared by suspending freshly precipitated magnesium carbonate in water, saturating with carbon dioxide under a pressure of about three atmospheres, and decanting the clear solution. It contains not less than 2·5 per cent. w/v of $Mg(HCO_3)_2$.

Characters. A clear, colourless liquid, which may effervesce slightly, when the containing vessel is first opened.

Tests for Identity. Alkaline to *methyl orange*.

When gently warmed, it effervesces, a precipitate of magnesium carbonate being formed.

Yields, when neutralised, the *reactions* characteristic of magnesium.

LIQUOR PLUMBI SUBACETATIS DILUTUS

[Liq. Plumb. Subacet. Dil.]

Dilute Solution of Lead Subacetate

Synonym. Liquor Plumbi Subacetatis.

Strong Solution of Lead Subacetate	12·5 millilitres
Distilled Water, recently boiled and cooled, sufficient to produce	1000 millilitres

Mix.

Dilute Solution of Lead Subacetate should be freshly prepared.

LIQUOR PLUMBI SUBACETATIS FORTIS

[Liq. Plumb. Subacet. Fort.]

Strong Solution of Lead Subacetate

Strong Solution of Lead Subacetate contains not less than 19 per cent. w/w, and not more than 21·5 per cent. w/w, of total Pb; and has an alkalinity corresponding to not less than 10·2 per cent. w/w, and not more than 11·6 per cent. w/w, of PbO.

Lead Acetate	250 grammes
Lead Monoxide, in powder .	175 grammes
Distilled Water, sufficient to produce	1000 millilitres

Dissolve the Lead Acetate in 750 millilitres of Distilled Water, add the Lead Monoxide, set aside for forty-eight hours, shaking occasionally; filter, and pass through the filter sufficient Distilled Water to produce the required volume.

Characters. A clear, colourless, alkaline liquid, which becomes turbid from absorption of carbon dioxide on exposure to air.

Tests for Identity. *Specific gravity* (15·5°/15·5°), about 1·28. Yields the *reactions* characteristic of lead, and of acetates.

Assay. *For total lead.* Heat nearly to boiling about 1 gramme, accurately weighed, with 50 millilitres of *dilute acetic acid*; add

1 gramme of *oxalic acid*, stir, and set aside until cold; collect the precipitate, and wash it with *water*; suspend it in 50 millilitres of *water*, acidify with *dilute sulphuric acid*, heat to 60°, and titrate with *N/10 potassium permanganate*. Each millilitre of *N/10 potassium permanganate* is equivalent to 0·01036 gramme of total Pb.

For alkalinity. Mix 20 grammes, accurately weighed, with 50 millilitres of *N/1 sulphuric acid* and sufficient *water* to produce 200 millilitres; shake thoroughly, and allow to settle. Decant or filter off 100 millilitres of the clear liquid, representing 10 grammes of Liquor Plumbi Subacetatis Fortis, and titrate the excess of acid with *N/1 sodium hydroxide*, using *solution of phenolphthalein* as indicator. Each millilitre of *N/1 sulphuric acid* is equivalent to 0·1116 gramme of PbO.

Storage. Strong Solution of Lead Subacetate should be kept in a well-filled, well-closed container.

Preparation. Liquor Plumbi Subacetatis Dilutus.

LIQUOR POTASSII HYDROXIDI

[Liq. Pot. Hydrox.]

Solution of Potassium Hydroxide

Synonyms. Liquor Potassæ : Solution of Potash.

Solution of Potassium Hydroxide is an aqueous solution of Potassium Hydroxide, containing 5 per cent. w/v of total alkali, calculated as KOH (limits, 4·75 to 5·25).

Characters. A colourless, strongly alkaline liquid. *Specific gravity* (15·5°/15·5°), about 1·045.

Assay. Titrate 20 millilitres with *N/1 sulphuric acid*, using *solution of methyl orange* as indicator. Each millilitre of *N/1 sulphuric acid* is equivalent to 0·05610 gramme of total alkali, calculated as KOH.

Storage. Solution of Potassium Hydroxide should be kept in a well-closed bottle of green glass.

LIQUOR QUININÆ AMMONIATUS

[Liq. Quinin. Ammon.]

Ammoniated Solution of Quinine

Synonyms. Tinctura Quininæ Ammoniata : Ammoniated Tincture of Quinine.

Ammoniated Solution of Quinine contains 2 per cent.

w/v of Quinine Sulphate (limits, 1·9 to 2·1), and 1 per cent. w/v of NH_3 (limits, 0·9 to 1·05).

Quinine Sulphate . . .	20 grammes
Dilute Solution of Ammonia .	100 millilitres
Alcohol (60 per cent.), sufficient to produce	1000 millilitres

Mix the Dilute Solution of Ammonia with 800 millilitres of Alcohol (60 per cent.); add the Quinine Sulphate; shake until a clear solution is produced; add sufficient Alcohol (60 per cent.) to produce the required volume; set aside for not less than three days; filter, if necessary.

Assay. *For quinine.* Add 20 millilitres to 50 millilitres of *water* and 20 millilitres of *chloroform* in a separator, shake, run off the chloroform layer, and shake with further quantities of 10 millilitres of *chloroform* until *complete extraction* of the alkaloid is effected. Wash the mixed chloroform solutions with a little *water*, remove the chloroform, add 5 millilitres of *alcohol (90 per cent.)*, evaporate, dry at 100°, and weigh. Each gramme of anhydrous quinine is equivalent to 1·36 grammes of $(C_{20}H_{24}O_2N_2)_2,H_2SO_4,7\frac{1}{2}H_2O$.

For ammonia. Titrate 20 millilitres with *N/2 hydrochloric acid*, using *solution of methyl red* as indicator. Each millilitre of *N/2 hydrochloric acid* is equivalent to 0·0085 gramme of NH_3.

Alcohol content, 52 to 54 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

Ammoniated Solution of Quinine contains in 4 mils 0·08 gramme, and in 60 minims about 1 grain, of Quinine Sulphate.

LIQUOR SODÆ CHLORINATÆ CHIRURGICALIS

[Liq. Sod. Chlorinat. Chir.]

Surgical Solution of Chlorinated Soda

Synonym. Dakin's Solution.

Surgical Solution of Chlorinated Soda contains not less than 0·5 per cent. w/v, and not more than 0·55 per cent. w/v, of available chlorine.

Chlorinated Lime . . .	of each a sufficient quantity
Sodium Carbonate . . .	
Boric Acid	
Distilled Water . . .	1000 millilitres

Determine the proportion of available chlorine in the Chlorinated Lime by the Assay described under 'Calx Chlorinata', and prepare the Solution by the following method, using the quantities of ingredients indicated in the table:—

Available Chlorine in Chlorinated Lime, per cent. w/w.	Chlorinated Lime, grammes.	Sodium Carbonate, grammes.	Boric Acid, grammes.
30	18·8	37·6	4·0
31	18·2	36·4	3·87
32	17·6	35·2	3·75
33	17·1	34·2	3·64
34	16·6	33·2	3·53
35	16·1	32·2	3·43

Dissolve the Sodium Carbonate in the Distilled Water, and add this solution gradually and with constant trituration to the Chlorinated Lime, previously powdered. Transfer to a suitable vessel, and shake occasionally during twenty minutes. Set aside for a further ten minutes, decant, and filter through a bleached filter. To the clear filtrate add the Boric Acid, and shake until dissolved.

Assay. Add 10 millilitres to 1 gramme of *potassium iodide*, dissolved in 5 millilitres of *water*; acidify with 4 millilitres of *acetic acid*, and titrate the liberated iodine with *N/10 sodium thiosulphate*. Each millilitre of *N/10 sodium thiosulphate* is equivalent to 0·003546 gramme of available chlorine.

Storage. Surgical Solution of Chlorinated Soda should be kept in a well-closed container, protected from light, and stored in a cool place. When stored, it is liable to diminution in strength.

LIQUOR SODII CHLORIDI PHYSIOLOGICUS

[Liq. Sod. Chlorid. Physiol.]

Physiological Solution of Sodium Chloride

Synonyms. Physiological Saline Solution: Normal Saline Solution.

Sodium Chloride . . .	9 grammes
Distilled Water, sufficient to produce	1000 millilitres

Dissolve; filter; sterilise by *heating in an autoclave*, or by *Tyndallisation*, or by *filtration*.

When Physiological Solution of Sodium Chloride is intended for intravenous injection it should be prepared with Sterilised Water for Intravenous Injections, and should be used within twenty-four hours after its preparation.

LIQUOR STRYCHNINÆ HYDROCHLORIDI

[Liq. Strych. Hydrochlor.]

Solution of Strychnine Hydrochloride

Solution of Strychnine Hydrochloride contains 1 per cent. w/v of Strychnine Hydrochloride (limits, 0·95 to 1·05).

Strychnine Hydrochloride . .	10 grammes
Alcohol (90 per cent.) . .	250 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Mix the Alcohol (90 per cent.) with an equal volume of Distilled Water; dissolve the Strychnine Hydrochloride in the mixture, and add sufficient Distilled Water to produce the required volume. Mix.

Assay. Transfer 20 millilitres to a separator, add 20 millilitres of *water*, 5 millilitres of *dilute solution of ammonia* and 25 millilitres of *chloroform*; shake well, and allow to separate. Run off the lower layer, and continue the extraction with 25 millilitre quantities of *chloroform*, until *complete extraction* of the alkaloid is effected. Wash each chloroform solution with the same 20 millilitres of *water*, contained in a second separator; mix the chloroform solutions, remove the chloroform, add 5 millilitres of *alcohol (95 per cent.)*, evaporate, and dry for half an hour at 100°. Dissolve the residue in 10 millilitres of *N/10 sulphuric acid*, and titrate with *N/10 sodium hydroxide*, using *solution of methyl red*, or *tincture of cochineal*, as indicator.

Each millilitre of *N/10 sulphuric acid* is equivalent to 0·04067 gramme of $C_{21}H_{22}O_2N_2,HCl,2H_2O$.

Alcohol content, 21 to 24 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
0·2 to 0·8 mil.	**3 to 12 minims.**

Solution of Strychnine Hydrochloride contains in 0·8 mil 0·008 gramme, and in 12 minims about 1/9 grain, of Strychnine Hydrochloride.

LOBELIA

[Lobel.]

Lobelia

Synonym. Lobeliæ herba I.A.

Lobelia consists of the dried aerial parts of *Lobelia inflata* Linn. It contains not more than 60 per cent. of stems, and not more than 2 per cent. of other organic matter.

Characters. Stems, rounded, channelled and furnished with narrow wings; green or with a purplish tint; bearing unicellular hairs up to about 1·2 millimetres long, and alternate leaves or leaf scars. Leaves, ovate to narrowly ovate; irregularly toothed, hairy, pale green. Capsules, inflated, ovoid or ellipsoidal, bilocular, containing when ripe numerous minute, ovoid, reticulate, brown seeds 0·5 to 0·7 millimetre long and about 0·3 millimetre wide. The distinctive microscopical characters include the conical unicellular hairs up to about 1·2 millimetres long with thin, warty walls; the anastomosing laticiferous vessels of the stem; the straight-walled papillose cells of the upper epidermis of the leaf; the minute droplets of oil scattered throughout the mesophyll; the teeth with several water-pores on the upper surface of the leaf; elongated polygonal cells of the seed-coats with thick lignified brown walls. Odour, slight and somewhat irritating; taste, at first slight, but subsequently burning and acrid.

Test for Purity. *Acid-insoluble ash*, not more than 5 per cent.

Preparation. Tinctura Lobeliæ Ætherea.

DOSES

Metric.	**Imperial.**
0·06 to 0·2 gramme.	**1 to 3 grains.**

LOTIO HYDRARGYRI NIGRA

[Lot. Hydrarg. Nigr.]

Black Mercurial Lotion

Synonym. Black Wash.

Mercurous Chloride . . .	7 grammes
Glycerin	50 millilitres
Solution of Calcium Hydroxide, sufficient to produce . .	1000 millilitres

Triturate the Mercurous Chloride with the Glycerin, and gradually add sufficient Solution of Calcium Hydroxide to produce the required volume.

MAGNESII CARBONAS LEVIS

[Mag. Carb. Lev.]

Light Magnesium Carbonate

Light Magnesium Carbonate is a hydrated basic magnesium carbonate, and may be prepared by boiling together dilute aqueous solutions of magnesium sulphate and sodium carbonate.

Characters. A very light, white powder; odourless; almost tasteless. Stable in air.

Almost insoluble in *water*; insoluble in *alcohol* (*90 per cent.*); soluble with effervescence in dilute acids.

Tests for Identity. Yields the *reactions* characteristic of magnesium, and of carbonates.

Tests for Purity. Boil 1 gramme with 50 millilitres of *water*, and filter; the filtrate, evaporated and dried at 100°, leaves not more than 0·01 gramme of residue (limit of soluble matter).

Dissolve 1 gramme in 5 millilitres of *hydrochloric acid* and 25 millilitres of *water*, boil to remove carbon dioxide, and make alkaline with *dilute solution of ammonia*; no blue colour is produced (limit of copper).

Dissolve 1 gramme in 25 millilitres of a 20 per cent. w/w aqueous solution of *sulphuric acid*, and add 50 millilitres of *alcohol* (*95 per cent.*); allow to stand overnight, and filter through a Gooch crucible packed with asbestos, which has been previously washed with *dilute sulphuric acid* and ignited; wash with 200 millilitres of a mixture of 2 volumes of *alcohol (95 per cent.)* and 1 volume of a 20 per cent. w/w aqueous solution of *sulphuric acid*; the residue, after drying and igniting, weighs not more than 0·020 gramme (limit of calcium).

0·5 gramme, dissolved in *water* by the addition of 1·5 millilitres of *nitric acid*, complies with the *limit test for chlorides.*

0·25 gramme, dissolved in *water* by the addition of 2 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates.*

0·1 gramme complies with the *limit test for iron.*

Arsenic limit, 5 parts per million. *Lead limit*, 20 parts per million.

Leaves, on ignition, not less than 42 per cent., and not more than 45 per cent., of residue.

Preparation. Pulvis Rhei Compositus.

DOSES

Metric.	Imperial.
0·6 to 4 grammes.	10 to 60 grains.

MAGNESII CARBONAS PONDEROSUS

[Mag. Carb. Pond.]

Heavy Magnesium Carbonate

Heavy Magnesium Carbonate is a hydrated basic magnesium carbonate, and may be prepared by mixing boiling concentrated solutions of magnesium sulphate and sodium carbonate, evaporating to dryness, and washing the product.

Characters. A white, granular powder; odourless; almost tasteless.

Almost insoluble in *water*, and in *alcohol (90 per cent.)*; soluble with effervescence in dilute acids.

Tests for Identity. Yields the *reactions* characteristic of magnesium, and of carbonates.

Tests for Purity. Boil 1 gramme with 50 millilitres of *water*, and filter; the filtrate, evaporated and dried at 100°, leaves not more than 0·01 gramme of residue (limit of soluble matter).

Dissolve 1 gramme in 5 millilitres of *hydrochloric acid* and 25 millilitres of *water*, boil to remove carbon dioxide, and make alkaline with *dilute solution of ammonia*; no blue colour is produced (limit of copper).

Carry out the test for calcium described under 'Magnesii Carbonas Levis'; the residue weighs not more than 0·007 gramme (limit of calcium).

1 gramme, dissolved in *water* by the addition of 2 millilitres of *nitric acid*, complies with the *limit test for chlorides.*

0·2 gramme, dissolved in *water* by the addition of 2 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates.*

0·1 gramme complies with the *limit test for iron.*

Arsenic limit, 5 parts per million. *Lead limit*, 20 parts per million.

Leaves, on ignition, not less than 42 per cent., and not more than 45 per cent., of residue.

Preparation. Pulvis Rhei Compositus.

DOSES

Metric.	**Imperial.**
0·6 to 4 grammes.	**10 to 60 grains.**

MAGNESII OXIDUM LEVE

[Mag. Oxid. Lev.]

Light Magnesium Oxide

Synonyms. Magnesia Levis: Light Magnesia.

MgO . . . . . Mol. Wt. 40·32

Light Magnesium Oxide may be prepared by heating Light Magnesium Carbonate to a dull red heat.

Characters. A very light, white powder; odourless; taste, slightly alkaline.

Almost insoluble in *water*; insoluble in *alcohol (90 per cent.)*; soluble in dilute acids.

Tests for Identity. Yields the *reactions* characteristic of magnesium.

Tests for Purity. *Arsenic limit*, 5 parts per million. *Lead limit*, 20 parts per million.

Loses, on ignition, not more than 5 per cent. of its weight.

Complies with the other Tests for Purity described under 'Magnesii Carbonas Levis' when two-fifths of the stated quantity is taken for each test.

Storage. Light Magnesium Oxide should be kept in a well-closed container.

Preparation. Mistura Magnesii Hydroxidi.

DOSES

Metric.	**Imperial.**
0·6 to 4 grammes.	**10 to 60 grains.**

MAGNESII OXIDUM PONDEROSUM

[Mag. Oxid. Pond.]

Heavy Magnesium Oxide

Synonyms. Magnesia Ponderosa : Heavy Magnesia.

MgO . . . . . . Mol. Wt. 40·32

Heavy Magnesium Oxide may be prepared by heating Heavy Magnesium Carbonate to a dull red heat.

Characters. A white powder; odourless; taste, slightly alkaline. Almost insoluble in *water*; insoluble in *alcohol* (*90 per cent.*); soluble in dilute acids.

Tests for Identity. Yields the *reactions* characteristic of magnesium.

Tests for Purity. *Arsenic limit,* 5 parts per million. *Lead limit,* 20 parts per million.

Loses, on ignition, not more than 5 per cent. of its weight.

Complies with the other Tests for Purity described under 'Magnesii Carbonas Ponderosus' when two-fifths of the stated quantity is taken for each test.

Storage. Heavy Magnesium Oxide should be kept in a well-closed container.

DOSES

Metric.	Imperial.
0·6 to 4 grammes.	10 to 60 grains.

MAGNESII SULPHAS

[Mag. Sulph.]

Magnesium Sulphate

Synonym. Epsom Salts.

$MgSO_4,7H_2O$ . . . Mol. Wt. 246·5

Magnesium Sulphate may be obtained by the interaction of magnesium carbonate and sulphuric acid. It contains not less than 99·5 per cent., and not more than the equivalent of 102 per cent., of $MgSO_4,7H_2O$.

Characters. Colourless crystals; odourless; taste, cool, saline and bitter. Effloresces in warm dry air.

Soluble in 1·5 parts of *water*; sparingly soluble in *alcohol* (*90 per cent.*).

Tests for Identity. Yields the *reactions* characteristic of magnesium, and of sulphates.

Tests for Purity. 1 gramme, dissolved in 10 millilitres of *water*, is neutral to *litmus.*

2 grammes, dissolved in 20 millilitres of *water* and acidified with 1 millilitre of *acetic acid*, shows no turbidity on the addition of a few drops of *solution of potassium ferrocyanide* (limit of zinc).

1 gramme complies with the *limit test for chlorides.*

10 grammes, dissolved in 20 millilitres of *water* and heated on a water-bath for one hour, yields a clear colourless solution (limit of iron).

Arsenic limit, 2 parts per million. *Lead limit*, 5 parts per million.

Assay. Dissolve about 0·5 gramme, accurately weighed, in 50 millilitres of *water*, add 20 millilitres of *solution of ammonium chloride*, 20 millilitres of *strong solution of ammonia*, and a slight excess of *solution of sodium phosphate*; shake the mixture vigorously for half an hour, and allow it to stand for four hours; filter off the precipitate, and wash it with *dilute solution of ammonia* diluted with four times its volume of *water*, until the washings are free from chloride; dry, ignite, and weigh the residue. Each gramme of the residue is equivalent to 2·214 gramme of $MgSO_4,7H_2O$.

Preparations. Mistura Magnesii Hydroxidi.
Mistura Sennæ Composita.

DOSES

Metric.	Imperial.
2 to 16 grammes.	30 to 240 grains.

MEL BORACIS

[Mel. Borac.]

Honey of Borax

Synonyms. Borax Honey: Borax and Honey.

Borax	100 grammes
Glycerin	50 grammes.
Purified Honey . . .	850 grammes

Powder the Borax; triturate with the Glycerin and the Purified Honey, and warm gently, with constant stirring, until solution is effected.

MEL DEPURATUM

[Mel. Depur.]

Purified Honey

Purified Honey is prepared by melting honey of commerce, allowing the scum to rise to the surface, straining, and adjusting, if necessary, the *specific gravity*, (15·5°/15·5°) to 1·36 by the addition of Distilled Water.

Characters. A thick, syrupy, translucent, pale yellow or yellowish-brown liquid; odour, characteristic; taste, sweet and characteristic.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·359 to 1·361.

Dissolve 20 grammes in sufficient *water* to produce 100 millilitres. This solution complies with the following tests:—

Optical rotation after decolourising with *decolourising charcoal* if necessary, + 0·6° to − 2°, corresponding to a *specific rotation* of + 3° to − 10° for the original purified honey.

10 millilitres complies with the *limit test for chlorides.*

25 millilitres complies with the *limit test for sulphates.*

Stir 10 millilitres with 5 millilitres of *ether.* Allow to separate, and draw off 2 millilitres of the ethereal layer into a small dish. Allow the ether to evaporate, and add to the residue one drop of *solution of resorcinol in hydrochloric acid*; no persistent cherry-red, or brown-red, colour is produced, but at most a transient pink colour which fades in half a minute (absence of artificial invert sugar).

Leaves, on incineration, not more than 0·3 per cent. w/w of residue.

MENTHOL

[Menthol.]

Menthol

$C_{10}H_{19}OH$ . . . . Mol. Wt. 156·2

Menthol is a saturated cyclic alcohol, *p*-menthan-3-ol, obtained from the volatile oils of various species of *Mentha.*

Characters. Colourless, acicular or prismatic, crystals; odour, penetrating, resembling that of peppermint; taste, warm and aromatic, followed by a sensation of cold.

Freely soluble in *alcohol* (*90 per cent.*), in *ether*, in *chloroform*, and in essential oils; soluble in 6 parts of *liquid paraffin.*

Tests for Identity and Purity. *Melting-point,* 42° to 43°.

An alcoholic solution is lævo-rotatory, and neutral to *litmus.*

Dissolve a few crystals in 1 millilitre of *glacial acetic acid,* add 3 drops of *sulphuric acid* and 1 drop of *nitric acid*; no green colour is developed (distinction from thymol).

Heated in an open dish, it is volatilised, and leaves not more than 0·05 per cent. of residue.

DOSES

Metric.	**Imperial.**
0·03 to 0·12 gramme.	**$^1/_2$ to 2 grains.**

METHYLIS SALICYLAS

[Methyl. Salicyl.]

Methyl Salicylate

$HO{\cdot}C_6H_4{\cdot}CO_2{\cdot}CH_3$ $[HO : CO_2{\cdot}CH_3 = 1 : 2]$

Mol. Wt. 152·1

Methyl Salicylate may be prepared by the esterification of salicylic acid with methyl alcohol. It contains not less than 98 per cent. of $C_8H_8O_3$.

Characters. A colourless, or pale yellow, liquid; odour, characteristic and aromatic; taste, sweet, warm and aromatic.

Slightly soluble in *water*; miscible with *alcohol* (*90 per cent.*).

Tests for Identity and Purity. 10 millilitres of a saturated aqueous solution gives a violet colour on the addition of one drop of *test-solution of ferric chloride.*

Specific gravity (15·5°/15·5°), 1·186 to 1·191; *refractive index* at 20°, 1·536 to 1·538.

Soluble in 10 volumes of *alcohol* (*70 per cent.*).

5 grammes, shaken with 25 millilitres of freshly boiled and cooled *water,* requires for neutralisation not more than 0·4 millilitre of *N/10 sodium hydroxide, solution of phenol red* being used as indicator (limit of free acid).

Assay. Carry out the *method for the determination of esters in volatile oils.* Each millilitre of *N/2 potassium hydroxide* is equivalent to 0·07603 gramme of $C_8H_8O_3$.

DOSES

Metric.	**Imperial.**
0·3 to 1 mil.	**5 to 15 minims.**

METHYLSULPHONAL

[Methylsulphonal.]

Methylsulphonal

$(CH_3)(C_2H_5)C(SO_2 \cdot C_2H_5)_2$. . Mol. Wt. 242·3

Methylsulphonal is diethylsulphonemethylethylmethane, and may be obtained by the oxidation of the product of the interaction of methyl ethyl ketone and ethyl mercaptan.

Characters. Colourless, lustrous scales, or a white powder; odourless; taste, slightly bitter.

Soluble in 320 parts of *water*, and in 12 parts of *alcohol* (*90 per cent.*).

Tests for Identity and Purity. *Melting-point,* 76° to 78°.

Heat with an equal bulk of *decolourising charcoal* in a dry test-tube; the unpleasant odour of mercaptan is given off.

Heat with *anhydrous sodium acetate*; hydrogen sulphide is evolved.

A saturated aqueous solution is neutral to *litmus* (limit of free acid).

100 millilitres of a cold saturated aqueous solution does not immediately decolourise 1 drop of *N/10 potassium permanganate* (limit of readily oxidisable substances).

Leaves, on incineration, not more than 0·05 per cent. of residue.

DOSES

Metric.	**Imperial.**
0·3 to 1·2 grammes.	**5 to 20 grains.**

METHYLTHIONINÆ CHLORIDUM

[Methylthionin. Chlor.]

Methylene Blue

Synonym. Methylthionine Chloride.

$C_{16}H_{18}N_3ClS$ . . . . Mol. Wt. 319·7

Methylene Blue is tetramethylthionine chloride, and may be prepared by the interaction of dimethyl-*p*-phenylenediamine with thiosulphuric acid, and the subsequent treatment and oxidation of the product. It contains not less than 80 per cent. of $C_{16}H_{18}N_3ClS$.

Characters. A dark greenish, crystalline powder with a metallic lustre, or a dull, dark green or brown, powder. Almost odourless.

Soluble in *water*, in *alcohol (90 per cent.)*, and in *chloroform.*

Tests for Identity. Dissolve 0·01 gramme in 100 millilitres of *water*; a clear deep blue solution is produced. The solution responds to the following tests:—

10 millilitres, warmed with 1 millilitre of *acetic acid* and 0·1 gramme of *zinc powder*, is decolourised; on filtering the solution and exposing it to the air, the blue colour returns.

10 millilitres produces with a few drops of *solution of potassium iodide* a deep blue flocculent precipitate which separates slowly, leaving the supernatant liquid pale blue.

10 millilitres, acidified with 1 millilitre of *dilute sulphuric acid*, gives with a few drops of *N/10 potassium dichromate* a reddish violet colour, and a bluish violet precipitate; the addition of *solution of sulphurous acid* restores the blue colour.

10 millilitres gives with a few drops of *N/10 iodine* a deep brown colour; the addition of *N/10 sodium thiosulphate* restores the blue colour.

Tests for Purity. Moisten 0·1 gramme with *sulphuric acid*, and ignite; boil the residue with 5 millilitres of *dilute hydrochloric acid* and 5 millilitres of *water*, add 5 millilitres of *dilute solution of ammonia*, and filter; to the filtrate add 2 drops of *solution of ammonium hydrosulphide*; no turbidity or precipitate is produced (limit of zinc).

Arsenic limit, 10 parts per million.

Assay. Dissolve 0·5 gramme, accurately weighed, in 100 millilitres of *water*, add 10 millilitres of *hydrochloric acid*, and heat the solution to the boiling-point; replace the air in the flask by *carbon dioxide*, and titrate with *N/10 titanous chloride* until the blue colour disappears, leaving the solution reddish-grey. Each millilitre of *N/10 titanous chloride* is equivalent to 0·01598 gramme of $C_{16}H_{18}N_3ClS$.

DOSES

Metric.	**Imperial.**
0·06 to 0·3 gramme.	**1 to 5 grains.**

MISTURA MAGNESII HYDROXIDI

[Mist. Mag. Hydrox.]

Mixture of Magnesium Hydroxide

Synonym. Cream of Magnesia.

Mixture of Magnesium Hydroxide is an aqueous suspension of hydrated magnesium oxide. It contains the equivalent of 8·25 per cent. w/v of $Mg(OH)_2$ (limits, 7·75 to 8·75).

Magnesium Sulphate . .	47·5 grammes
Sodium Hydroxide . .	15 grammes
Light Magnesium Oxide .	52·5 grammes
Distilled Water, sufficient to produce	1000 millilitres

Dissolve the Sodium Hydroxide in 150 millilitres of Distilled Water, add the Light Magnesium Oxide, mix to form a smooth cream, and then add sufficient Distilled Water to produce 2500 millilitres. Pour this suspension in a thin stream into a solution, made by dissolving the Magnesium Sulphate in 2500 millilitres of Distilled Water, stirring continuously during the mixing. Allow the precipitate to subside, and remove the clear liquid; transfer the residue to a calico strainer, allow to drain, and wash the precipitate with Distilled Water, until the washings give only a slight *reaction* for sulphates. Mix the washed precipitate with sufficient Distilled Water to produce the required volume.

Tests for Purity. Dissolve 10 millilitres in 20 millilitres of *hydrochloric acid*, and dilute to 400 millilitres with *water*; 25 millilitres of the solution, filtered if necessary, complies with the *limit test for sulphates.*

Arsenic limit, 1 part per million. *Lead limit,* 2 parts per million.

Assay. Dilute 10 millilitres with 50 millilitres of *water*, and add 50 millilitres of *N/1 sulphuric acid.* Titrate the excess of acid with *N/1 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/1 sulphuric acid* is equivalent to 0·02917 gramme of $Mg(OH)_2$.

DOSES

Metric.	**Imperial.**
4 to 16 mils.	**60 to 240 minims.**

Mixture of Magnesium Hydroxide contains in 16 mils the equivalent of 0·9 gramme, and in 240 minims the equivalent of about 12½ grains, of magnesium oxide.

MISTURA SENNÆ COMPOSITA

[Mist. Senn. Co.]

Compound Mixture of Senna

Synonym. Black Draught.

Magnesium Sulphate . .	250 grammes
Liquid Extract of Liquorice .	50 millilitres
Compound Tincture of Cardamom	100 millilitres
Aromatic Spirit of Ammonia .	50 millilitres
Fresh Infusion of Senna, sufficient to produce	1000 millilitres

Dissolve the Magnesium Sulphate in 500 millilitres of Fresh Infusion of Senna. Mix the Liquid Extract of Liquorice, Compound Tincture of Cardamom, and Aromatic Spirit of Ammonia. Add the mixture to the solution of Magnesium Sulphate, and then add sufficient Fresh Infusion of Senna to produce the required volume.

DOSES

Metric.	**Imperial.**
30 to 60 mils.	**1 to 2 fluid ounces.**

In making Compound Mixture of Senna, Concentrated Infusion of Senna, suitably diluted, may be used.

MORPHINÆ HYDROCHLORIDUM

[Morph. Hydrochlor.]

Morphine Hydrochloride

$C_{17}H_{19}O_3N,HCl,3H_2O$ . . Mol. Wt. 375·7

Morphine Hydrochloride is the hydrochloride of an alkaloid, morphine, obtained from opium.

Characters. Colourless, glistening needles or crystalline powder; odourless; taste, bitter.

Soluble in 25 parts of *water*, and in 50 parts of *alcohol* (*90 per cent.*); insoluble in *ether*, and in *chloroform*.

An aqueous solution is neutral to *litmus*.

Tests for Identity. Sprinkle a little, previously powdered, on the surface of a drop of *nitric acid*; an orange-red colour is produced.

Add a little, previously powdered, to 1 millilitre of *sulphuric acid*, containing 1 drop of *solution of formaldehyde*; a purple colour is produced.

To 5 millilitres of a 3 per cent. w/v aqueous solution add 1 drop of *dilute solution of ammonia*; a crystalline precipitate is formed, which dissolves immediately on the addition of *solution of sodium hydroxide*.

To 5 millilitres of a 2 per cent. w/v aqueous solution add 1 drop of *test-solution of ferric chloride*; a blue colour is produced.

To a 2 per cent. w/v aqueous solution add *solution of potassium ferricyanide*, containing 1 drop per millilitre of *test-solution of ferric chloride*; an immediate bluish-green colour is produced (distinction from codeine).

To 0·02 gramme, dissolved in 5 millilitres of *N/10 sulphuric acid*, add 0·5 millilitre of a saturated solution of *potassium iodate*; an amber colour is produced, which reaches a maximum in about five minutes; on the addition of 0·5 millilitre of *strong solution of ammonia* the colour darkens almost to black (distinction from codeine and diamorphine).

Warm 0·1 gramme, dissolved in 2 millilitres of *sulphuric acid*, on a water-bath for fifteen minutes, cool, and add a few drops of *dilute nitric acid*; a blood-red colour is produced.

Yields the *reactions* characteristic of chlorides.

Tests for Purity. Dissolve 1 gramme in 10 millilitres of *N/1 sodium hydroxide* in a separator; shake the solution with three successive quantities of 15, 10 and 10 millilitres of *chloroform*, and filter the separated chloroform solutions through a small filter, previously moistened with *chloroform*. Mix the chloroform solutions, and shake with 5 millilitres of *water*; separate the chloroform solution, and evaporate it to dryness on a water-bath; the residue weighs not more than 0·015 gramme (limit of other alkaloids).

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint pink colour is produced (limit of readily carbonisable substances).

0·2 gramme loses, when dried at 120°, not more than 0·029 gramme. The dried material is not more than faintly yellow in colour, and leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Morphine Hydrochloride should be kept in a well closed container, protected from light.

Sterilisation of a Solution. A solution of Morphine Hydrochloride for injection is sterilised by *heating in an autoclave*, or by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass*.

Preparations. Liquor Morphinæ Hydrochloridi.
Suppositorium Morphinæ.
Trochiscus Morphinæ et Ipecacuanhæ.

DOSES

Metric.	Imperial.
0·008 to 0·02 gramme.	**$^1/_8$ to $^1/_3$ grain.**

MORPHINÆ TARTRAS

[Morph. Tart.]

Morphine Tartrate

$(C_{17}H_{19}O_3N)_2,C_4H_6O_6,3H_2O$. Mol. Wt. 774·4

Morphine Tartrate is the tartrate of an alkaloid, morphine, obtained from opium.

Characters. Minute, acicular, colourless crystals; odourless; taste, bitter. Effloresces on exposure to air.

Soluble in 11 parts of *water*; sparingly soluble in *alcohol* (*90 per cent.*); almost insoluble in *ether*, and in *chloroform*.

An aqueous solution is neutral to *litmus*.

Tests for Identity. Yields the *reactions* characteristic of tartrates, and the reactions characteristic of morphine, described under 'Morphinæ Hydrochloridum'; for the colour tests involving the use of *sulphuric acid*, morphine regenerated from the tartrate by the following process is used:—

Dissolve 0·5 gramme in 10 millilitres of *water*, and add *strong solution of ammonia* in slight excess; collect the crystalline precipitate, wash with a little water, and dry at 100°.

Tests for Purity. Complies with the test for limit of other alkaloids described under 'Morphinæ Hydrochloridum'.

0·2 gramme loses, when dried at 100°, not more than 0·014 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Morphine Tartrate should be kept in a well-closed container, protected from light.

Sterilisation of a Solution. A solution of Morphine Tartrate for injection is sterilised by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass.*

DOSES

Metric.	Imperial.
0·008 to 0·02 gramme.	**$^1/_8$ to $^1/_3$ grain.**

MUCILAGO ACACIÆ

[Mucil. Acac.]

Mucilage of Acacia

Synonym. Mucilage of Gum Acacia.

Acacia	400 grammes
Chloroform Water . . .	600 millilitres

Rapidly rinse the Acacia with a little Distilled Water; then dissolve it in the Chloroform Water in a closed vessel, and strain.

Storage. Mucilage of Acacia should be kept in a well-filled container.

DOSES

Metric.	Imperial.
4 to 16 mils.	60 to 240 minims.

MUCILAGO TRAGACANTHÆ

[Mucil. Trag.]

Mucilage of Tragacanth

Tragacanth, finely powdered .	12·5 grammes
Alcohol (90 per cent.) . .	25 millilitres
Chloroform Water, sufficient to produce	1000 millilitres

Mix the Tragacanth with the Alcohol (90 per cent.) in a dry bottle; add, as quickly as possible, sufficient Chloroform Water to produce the required volume, and shake vigorously.

DOSES

Metric.	Imperial.
4 to 16 mils.	60 to 240 minims.

MYRISTICA

[Myrist.]

Nutmeg

Nutmeg consists of the dried kernels of the seeds of *Myristica fragrans* Houtt.

Characters. Broadly oval, from 20 to about 30 millimetres long and about 20 millimetres broad; externally, greyish-brown or brown, marked with minute black points or lines, reticulately furrowed; exhibiting internally a greyish-brown endosperm veined with dark brown lines of perisperm. Outer layer, composed of cells strongly flattened radially, many with brown contents. Cells of the perisperm, large, with thin brown walls, many collapsed; in the perisperm, oil cells and tubes; cells of the endosperm, large, with thin, brown walls, and containing numerous simple and also compound starch grains with up to about 10 components; individual grains more or less rounded, up to 20 microns in diameter; most of the cells containing fat, and a large aleurone grain; an occasional cell containing tannin. Odour, strong and aromatic; taste, pungent and somewhat bitter.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

MYRRHA

[Myrrh.]

Myrrh

Myrrh is an oleo-gum-resin, obtained from the stem of *Commiphora molmol* Engl., and possibly other species of *Commiphora*. It contains not more than 4 per cent. of other organic matter.

Characters. Rounded or irregular tears, or masses of irregular tears, varying much in size; externally, reddish-brown or reddish-yellow, dry, and more or less covered by a fine powder; brittle, the fractured surface irregular, somewhat translucent, of a rich brown colour, oily and frequently exhibiting whitish marks. Odour, aromatic; taste, aromatic, bitter and acrid.

Test for Identity. Thoroughly triturate 0·1 gramme with 0·5 gramme of sand in *moderately coarse powder*, shake with 3 millilitres of *ether*, filter, allow the filtrate to evaporate in a porcelain dish so as to leave a thin film, and pass the vapour of *bromine* over the film; a violet colour is produced.

Tests for Purity. *Ash*, not more than 9 per cent.

Contains not more than 70 per cent. of matter insoluble in *alcohol* (*90 per cent.*), as determined by treating about 5 grammes, coarsely powdered and accurately weighed, as described under 'Asafœtida'.

Preparation. Tinctura Myrrhæ.

DOSES

Metric.	**Imperial.**
0·3 to 1 gramme.	**5 to 15 grains.**

NEOARSPHENAMINA

[Neoarsphenamin.]

Neoarsphenamine

CAUTION.—In any part of the British Empire in which Neoarsphenamine is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Synonyms. Novarsenobenzol : Novarsenobenzene.

Neoarsphenamine may be prepared by treating 3 : 3′-diamino-4 : 4′-dihydroxyarsenobenzene with sodium formaldehydesulphoxylate. It consists mainly of sodium 3 : 3′-diamino-4 : 4′-dihydroxyarsenobenzene-*N*-methylenesulphoxylate,

$$(NH_2)(OH)C_6H_3As : AsC_6H_3(OH)(NH{\cdot}CH_2{\cdot}O{\cdot}SONa).$$

It is distributed in hermetically sealed glass phials, from which air has been evacuated, or replaced by an inert gas.

Characters. A yellow, dry powder, freely mobile in contact with glass surfaces; odour, none, except that due to traces of ether or alcohol.

Soluble in *water*; insoluble in *dehydrated alcohol*, and in *ether*.

A 1 per cent. w/v aqueous solution is neutral, or slightly alkaline, to *litmus*.

Tests for Identity. Decolourises *solution of iodine*.

Dissolve 0·5 gramme in 1·5 millilitres of *water*, and add 1·5 millilitres of *dilute hydrochloric acid*; a yellow precipitate is produced. Warm the mixture; the gas evolved imparts a blue colour to *starch-iodate paper*.

Acidify with *phosphoric acid* a solution of 0·2 gramme in 10 millilitres of *water*, and distil about one-half of its volume. To the distillate add 5 drops of a 1·0 per cent. w/v aqueous solution of *phenol*, and run a layer of *sulphuric acid* under the mixture; a red colour is produced at the zone of contact.

Tests for Purity. Add 0·6 gramme to 1 millilitre of *water*; it dissolves rapidly, forming a clear yellow solution, free from suspended matter.

To a 10 per cent. w/v aqueous solution add an equal volume of *N/1 sodium carbonate*; no precipitate is produced (absence of arsphenamine).

When kept in a sealed phial at 56° for twenty-four hours, it retains its colour, physical properties, and solubility.

Assay. Carry out the *biological assay of neoarsphenamine*.

Storage. Neoarsphenamine should be kept at a temperature below 15°. If it has become darker in colour, it should not be used.

Sterilisation of a Solution. Neoarsphenamine is prepared in sterile solution for injection by dissolving the contents of a sealed container in the requisite amount of Sterilised Water for Intravenous Injections.

DOSES

Metric.	**Imperial.**
By intravenous injection.	
0·15 to 0·9 gramme.	**$2^1/_2$ to 14 grains.**

Neoarsphenamine contains approximately 20 per cent. of As.

NITROGENII MONOXIDUM

[Nitrogen. Monox.]

Nitrous Oxide

N_2O . . . . . . Mol. Wt. 44·02

Nitrous Oxide may be prepared by heating ammonium nitrate. For convenience in use it is compressed in metal cylinders. When drawn from a cylinder in the upright position, it contains not less than 93 per cent. v/v of nitrous oxide.

Characters. A colourless gas, heavier than air; odour, characteristic; taste, faintly sweetish.

One volume dissolves in about 2 volumes of *water* at temperatures between 15° and 25°.

Tests for Identity. A glowing splinter of wood bursts into flame on being plunged into the gas.

When mixed with an equal volume of *nitric oxide,* no red fumes are produced (distinction from oxygen).

Tests for Purity. Contains not more than 50 parts per million v/v of carbon monoxide. For this determination the gas used is the first portion drawn from the cylinder and is taken with the cylinder in the upright position. Pass a volume equivalent to 5 to 10 litres, measured at normal temperature and pressure, through a purifying train, comprising (1) *fuming sulphuric acid,* (2) *sulphuric acid,* (3) 33 per cent. w/v aqueous solution of *potassium hydroxide,* (4) *soda lime,* (5) *potassium hydroxide,* (6) *phosphorus pentoxide*; then pass it through a tube containing *iodine pentoxide* (previously dried at 200°) maintained at a temperature of 120°, absorbing the liberated iodine in *solution of potassium iodide.* Sweep out the apparatus by passing through it 5 litres of air free from carbon monoxide. Titrate the iodine with *N/500 sodium thiosulphate*, and from the amount used subtract the amount required in a similar experiment, in which 5 litres of air free from carbon monoxide is used. Each millilitre of *N/500 sodium thiosulphate* is equivalent to 0·112 millilitre of carbon monoxide at normal temperature and pressure.

Pass a measured quantity successively through absorption tubes, containing (*a*) *phosphorus pentoxide*, and (*b*) *soda lime*. The increase in weight of tube (*a*) does not exceed 0·002 gramme per litre of gas, and the increase in weight of tube (*b*) does not exceed 0·004 gramme per litre of gas, both the initial and final weighings of the absorption tubes being made when the air in them has been displaced with nitrous oxide (limit of water vapour and carbon dioxide).

Expose a measured volume to the temperature of liquid air; the proportion of uncondensed gases is not greater than 6·5 per cent. v/v (limit of uncondensable gases).

Pass a volume equivalent to 2 litres, measured at normal temperature and pressure, through a *mercuric chloride paper* attached to a glass tube, as in the *arsenic limit test*; no visible stain is produced (absence of arsenuretted hydrogen, and of phosphoretted hydrogen).

For the following tests the reagent is placed in a 100 millilitre cylinder which has a height of about 20 centimetres and is closed with a stopper, containing an inlet tube which has a bore not exceeding 0·5 millimetre and passes to the bottom of the cylinder, and an exit tube. A volume equivalent to 2 litres, measured at normal temperature and pressure, is passed through the reagent in thirty minutes for each of the following tests:—

> Pass the gas through 100 millilitres of *water*, containing 1 millilitre of *solution of silver nitrate*; neither opalescence nor darkening is produced (absence of halides, and of sulphuretted hydrogen).
>
> To 300 millilitres of *water* add 1 millilitre of *solution of methyl red*, and boil for five minutes. Transfer 100 millilitres of this solution to three similar cylinders and label them 1, 2 and 3. While still warm add 0·1 millilitre of *N/100 sulphuric acid* or *N/100 hydrochloric acid* to tube 1, and 0·2 millilitre of the same acid to tubes 2 and 3; cork tubes 1 and 3, and pass the gas through tube 2; the colour in tube 2 is not more yellow than that in tube 1, and not more pink than that in tube 3 (limits of acidity and alkalinity).
>
> Pass the gas through 100 millilitres of *water*, containing 0·2 millilitre of *N/10 potassium permanganate*; the colour is not completely discharged (limit of reducing substances).
>
> Pass the gas through a freshly prepared solution of 0·5 gramme of *soluble starch* and 0·5 gramme of *potassium iodide* in 100 millilitres of *water*; no colour is developed (limit of oxidising substances).

NUX VOMICA

[Nux Vom.]

Nux Vomica

Synonym. Strychni semen I.A.

Nux Vomica consists of the dried ripe seeds of *Strychnos Nux-vomica* Linn. It contains not more than 1 per cent. of other organic matter, and not less than 1·2 per cent. of strychnine.

Characters. Seeds, grey or greenish-grey, disc-shaped, nearly flat but sometimes irregularly bent; 10 to 30 millimetres in diameter and 4 to 6 millimetres thick; margin, rounded or somewhat acute; hilum raised and connected to the micropyle by a radial ridge. Surface, silky, densely covered with radiately arranged, closely appressed, lignified hairs which have cylindrical upper parts up to 1 millimetre long, splitting into slender, rod-like fragments when the seeds are powdered, and thick walled bases with wavy-polygonal outlines in surface view, small branched cavities and slit-like pits. Endosperm, large, horny, of very thick-walled unlignified cells exhibiting a well-marked plasmodesma and an oil plasma with a few aleurone grains 10 to 30 microns in diameter. Cotyledons, small, cordate and leaf-like; radicle, cylindrical. Odourless; taste, extremely bitter.,

Assay. Weigh accurately 10 grammes in *No. 80 powder*, mix it with 60 millilitres of *alcohol* (*95 per cent.*), 5 millilitres of *dilute solution of ammonia*, and 20 millilitres of *chloroform*, and shake well. Set aside for one hour, shaking frequently. Transfer to an apparatus for *continuous extraction* with more of the same mixture, and extract for four hours. Remove the solvent, add 5 millilitres of *alcohol* (*95 per cent.*), 10 millilitres of *N/1 sulphuric acid*, 30 millilitres of *chloroform*, and 20 millilitres of *water*. Transfer to a separator, washing the flask with *N/10 sulphuric acid*, until the alkaloids are completely removed. Shake, allow to separate, and run off the chloroform. Continue the extraction with two further portions of 5 millilitres of *chloroform*. Mix the chloroform solutions, shake with two successive quantities of 10 millilitres of *N/10 sulphuric acid*, and reject the chloroform. Add the acid solutions to the first acid solution, make distinctly alkaline with *dilute solution of ammonia*, and extract the alkaloids by shaking with successive quantities of 20 millilitres of *chloroform*, until *complete extraction* of the alkaloids is effected. Remove the chloroform, add 5 millilitres of *alcohol* (*95 per cent.*), and evaporate to dryness. Dissolve the residue in a mixture of 15 millilitres of a

3 per cent. w/v *aqueous solution of sulphuric acid* and 2 millilitres of *nitric acid*, and allow to stand for thirty minutes at a temperature between 15° and 20°. Transfer to a separator containing 20 millilitres of *solution of sodium hydroxide*, shake for two minutes, and then shake with 20 millilitres of *chloroform*; separate the chloroform solution, and wash it first with 5 millilitres of *solution of sodium hydroxide*, and then with 20 millilitres of *water*. Continue the extraction with successive quantities of 10 millilitres of *chloroform*, until *complete extraction* of the alkaloid is effected, washing each chloroform solution with the solution of sodium hydroxide and the water, which was used for washing the first chloroform solution. Remove the chloroform, add 5 millilitres of *alcohol* (*95 per cent.*), evaporate, and dry for half an hour at 100°. Dissolve the residue in 10 millilitres of *N/10 sulphuric acid*, and titrate with *N/10 sodium hydroxide*, using *solution of methyl red*, or *tincture of cochineal*, as indicator. Each millilitre of *N/10 sulphuric acid* is equivalent to 0·03342 gramme of strychnine. Multiply the result by 1·02 in order to correct for loss of strychnine.

Preparations. Extractum Nucis Vomicæ Liquidum.
Tinctura Nucis Vomicæ.
Extractum Nucis Vomicæ Siccum.
Nux Vomica Pulverata.

When Nux Vomica is prescribed, Nux Vomica Pulverata shall be dispensed.

NUX VOMICA PULVERATA

[Nux Vom. Pulverat.]

Powdered Nux Vomica

Synonym. Pulvis Nucis Vomicæ.

Powdered Nux Vomica is Nux Vomica, reduced to a *fine powder* and adjusted, if necessary, either by the admixture in suitable proportions of powdered nux vomica, having lower or higher alkaloidal content, or by the addition of powdered Lactose, to contain 1·2 per cent. of strychnine (limits, 1·14 to 1·26).

Test for Purity. *Ash*, not more than 3 per cent.

Assay. Carry out the Assay as directed under 'Nux Vomica', using 10 grammes.

Storage. Powdered Nux Vomica should be kept in a well-closed container.

DOSES

Metric.	**Imperial.**
0·06 to 0·25 gramme.	**1 to 4 grains.**

Powdered Nux Vomica contains in 0·25 gramme 0·003 gramme, and in 4 grains about $^1/_{20}$ grain, of strychnine.

OCULENTA

[Oculent.]

Ointments for the Eye

Ointments for the Eye are prepared by the following process:—

Melt together 90 parts by weight of Yellow Soft Paraffin and 10 parts by weight of Wool Fat, filter while hot through coarse filter paper, placed in a heated funnel, and sterilise the mixture by heating at 150° for one hour. If the drug is the salt of an alkaloid, place the quantity of the drug, required for 100 grammes of the ointment, in a sterilised mortar, and add the smallest quantity of Distilled Water which will dissolve it; then add gradually to the solution sufficient of the melted basis for the product to weigh 100 grammes, and triturate the mixture continuously, until cold. If the drug is other than a salt of an alkaloid, place the quantity of the drug, required for 100 grammes of the ointment, in a sterilised mortar, and triturate with a small portion of the melted basis, until smooth; then add gradually sufficient of the melted basis for the product to weigh 100 grammes, and triturate the mixture continuously until cold.

The percentage quantity of a drug to be contained in each ointment for the eye is stated by the prescriber. In the case of the following drugs, if the proportion is not stated by the prescriber, ointments for the eye, containing the following proportions shall be dispensed:—

Oculentum Atropinæ: Atropine Sulphate, 0·25 per cent.

Oculentum Atropinæ cum Hydrargyri Oxido : Atropine Sulphate, 0·125 per cent. ; Yellow Mercuric Oxide, 1 per cent.

Oculentum Cocainæ : Cocaine Hydrochloride, 0·25 per cent.

Oculentum Hydrargyri Oxidi : Yellow Mercuric Oxide, 1 per cent.

Oculentum Hyoscinæ : Hyoscine Hydrobromide, 0·125 per cent.

Oculentum Iodoformi : Iodoform, 4 per cent.

Oculentum Physostigminæ. *Synonym.* Oculentum Eserinæ : Physostigmine Salicylate, 0·125 per cent.

Storage. Ointments for the Eye should be kept in small, well-closed containers, protected from light, and stored in a cool place.

OLEUM ABIETIS

[Ol. Abiet.]

Oil of Siberian Fir

Synonym. Oil of Pine.

Oil of Siberian Fir is the oil distilled from the fresh leaves of *Abies sibirica* Ledeb. It contains not less than 35 per cent. w/w, and not more than 45 per cent. w/w, of esters, calculated as bornyl acetate, $C_{12}H_{20}O_2$.

Characters. A colourless, or pale yellow, liquid ; odour, aromatic ; taste, pungent.

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), 0·905 to 0·925 ; *optical rotation*, – 32° to – 45° ; *refractive index* at 20°, 1·466 to 1·476.

Soluble in an equal volume of *alcohol* (*90 per cent.*).

Assay. Carry out the *method for the determination of esters in volatile oils.*

Storage. Oil of Siberian Fir should be kept in a well-closed container, protected from light, and stored in a cool place.

OLEUM AMYGDALÆ

[Ol. Amygdal.]

Almond Oil

Almond oil is the fixed oil, obtained from the seeds of *Prunus communis* Arcang. var. *dulcis* Schneid. or of *P. communis* Arcang. var. *amara* Schneid.

Characters. A pale yellow oil; odour, slight and characteristic; taste, bland and nutty.

Slightly soluble in *alcohol* (*90 per cent.*); miscible with *ether*, with *chloroform*, and with *light petroleum* (*boiling-point, 50° to 60°*).

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·915 to 0·920; *refractive index* at 40°, 1·4624 to 1·4650; *acid value*, not more than 4·0; *saponification value*, 188 to 196; *iodine value*, 95 to 100.

Remains clear after exposure to a temperature of − 10° for three hours; does not congeal, until the temperature has been reduced to about − 18°.

Shake 5 millilitres vigorously for one minute with 1 millilitre of a freshly prepared mixture of equal parts by weight of *sulphuric acid, fuming nitric acid* and *water*, kept cool while cautiously mixed; a whitish mixture, with not more than the very slightest tinge of red or brown, is produced, and, after some hours, a solid separates which is white, or sometimes tinged with green, the lower acid layer remaining colourless (absence of apricot-kernel oil, and of peach-kernel oil).

Complies with the *test for the absence of cottonseed oil, of sesame oil, and of arachis oil.*

DOSES

Metric.	**Imperial.**
15 to 30 mils.	**$^1/_2$ to 1 fluid ounce.**

OLEUM ANETHI

[Ol. Aneth.]

Oil of Dill

Oil of Dill is the oil distilled from Dill. It contains not less than 43 per cent. w/w, and not more than 63 per cent. w/w, of carvone, $C_{10}H_{14}O$.

Characters. A colourless, or pale yellow, liquid, darkening with age; odour, that of the fruit; taste, at first sweet and aromatic, subsequently pungent.

Tests for Identity and Purity. Soluble in an equal volume of *alcohol* (*90 per cent.*), and in 10 volumes of *alcohol* (*80 per cent.*); *specific gravity* (15·5°/15·5°), 0·900 to 0·915; *optical rotation*, + 70° to + 80°; *refractive index* at 20°, 1·481 to 1·492.

Assay. Carry out the *method for the determination of carvone.*

Storage. Oil of Dill should be kept in a well-closed container, protected from light, and stored in a cool place.

Preparation. Aqua Anethi Concentrata.

DOSES

Metric.	**Imperial.**
0·06 to 0·2 mil.	**1 to 3 minims.**

OLEUM ANISI

[Ol. Anis.]

Oil of Anise

Synonym. Oil of Aniseed.

Oil of Anise is the oil distilled from the dried ripe fruits of *Pimpinella Anisum* Linn., or from the dried fruits of the star anise, *Illicium verum* Hook. f.

Characters. A colourless, or pale yellow, liquid; odour, that of the fruit; taste, sweet and aromatic. Crystallises on cooling.

Tests for Identity and Purity. Soluble in 3 volumes of *alcohol* (*90 per cent.*), showing not more than slight opalescence; *specific gravity* (20°/15·5°), 0·980 to 0·994; *optical rotation*, − 2° to + 1°; *refractive index* at 20°, 1·553 to 1·560; *freezing-point*, not below 15°; *melting-point*, not below 17°.

Mix 1 millilitre with 1 millilitre of *glacial acetic acid*, add 40 millilitres of *water*, shake, filter until bright, and to the filtrate add 10 millilitres of *solution of hydrogen sulphide*; the colour is not deeper than that produced by adding 10 millilitres of *solution of hydrogen sulphide* to a solution of 0·0000366 gramme of *lead acetate* and 1 millilitre of *glacial acetic acid* in 40 millilitres of *water* (limit of lead).

Storage. Oil of Anise should be kept in a well-closed container, protected from light, and stored in a cool place. If the oil has crystallised, it should be melted and mixed before use.

DOSES

Metric.	Imperial.
0·06 to 0·2 mil.	1 to 3 minims.

OLEUM ARACHIS

[Ol. Arach.]

Arachis Oil

Synonyms. Nut Oil: Ground-nut Oil: Pea-nut Oil.

Arachis Oil is the fixed oil, expressed from the seeds of *Arachis hypogœa* Linn.

Characters. A pale yellow liquid; odour, faint and nut-like; taste, bland and nutty.

Slightly soluble in *alcohol* (*90 per cent.*); miscible with *ether*, with *chloroform*, and with *light petroleum* (*boiling-point, 50° to 60°*).

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·916 to 0·920; *refractive index* at 40°, 1·4625 to 1·4645; *acid value*, not more than 4; *saponification value*, 188 to 196; *iodine value*, 85 to 99.

Saponify 1 millilitre by boiling it in a small flask under a reflux condenser for five minutes with 5 millilitres of *1·5 N alcoholic potassium hydroxide*, then add 1·5 millilitres of *acetic acid* and 50 millilitres of *alcohol* (*70 per cent.*); warm until the solution is clear, and cool slowly, with a thermometer in the liquid; the temperature at which the solution becomes turbid is not lower than 39° (absence of other vegetable oils).

Complies with the *test for the absence of cotton-seed oil, and of sesame oil.*

DOSES

Metric.	**Imperial.**
15 to 30 mils.	**$^1/_2$ to 1 fluid ounce.**

OLEUM CADINUM

[Ol. Cadin.]

Oil of Cade

Synonym. Juniper Tar Oil.

Oil of Cade is an oily liquid, obtained by the destructive distillation of the woody portions of *Juniperus Oxycèdrus* Linn.

Characters. A dark reddish-brown or nearly black, oily liquid; odour, empyreumatic; taste, aromatic, bitter and acrid.

Very slightly soluble in *water*; partially soluble in cold *alcohol* (*90 per cent.*); almost entirely soluble in hot *alcohol* (*90 per cent.*); soluble in 3 volumes of *ether*, and in *chloroform*.

A filtered aqueous solution is almost colourless, and is acid to *litmus*.

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), 0·975 to 1·010; *refractive index* at 20°, 1·510 to 1·530.

Shake 1 millilitre with 20 millilitres of *water*, and filter; 5 millilitres of the filtrate gives a red colour with 3 drops of a 0·1 per cent. w/v aqueous solution of *ferric chloride*, a black precipitate with *solution of silver ammonio-nitrate*, and a red precipitate on boiling with *solution of potassio-cupric tartrate*.

Shake 1 millilitre with 15 millilitres of *light petroleum* (*boiling-point, 50° to 60°*), and filter; shake 10 millilitres of the filtrate with 10 millilitres of *strong solution of copper acetate*, and allow the liquids to separate; a portion of the upper layer, mixed with twice its volume of *ether*, shows no green colour, and not more than a pale yellowish-brown colour (absence of pine tar oil).

OLEUM CAJUPUTI

[Ol. Cajuput.]

Oil of Cajuput

Oil of Cajuput is the oil distilled from the fresh leaves and twigs of *Melaleuca Leucadendron* Linn., and other species of *Melaleuca*, and rectified by steam distillation. It contains not less than 50 per cent. w/w, and not more than 60 per cent. w/w, of cineole, $C_{10}H_{18}O$.

Characters. A colourless or yellow liquid; odour, agreeable and camphoraceous; taste, aromatic, bitter and camphoraceous.

Tests for Identity and Purity. Soluble in 2 volumes of *alcohol (80 per cent.)*; becomes less soluble with age; *specific gravity* (15·5°/15·5°), 0·916 to 0·926; *optical rotation*, not greater than − 4°; *refractive index* at 20°, 1·462 to 1·472.

Assay. Carry out the *method for the determination of cineole.*

Storage. Oil of Cajuput should be kept in a well-closed container, protected from light, and stored in a cool place.

Preparation. Spiritus Cajuputi.

DOSES

Metric.	Imperial.
0·06 to 0·2 mil.	1 to 3 minims.

OLEUM CARI

[Ol. Cari]

Oil of Caraway

Synonym. Oleum Carui.

Oil of Caraway is the oil distilled from Caraway, and rectified. It contains not less than 53 per cent. w/w, and not more than 63 per cent. w/w, of carvone, $C_{10}H_{14}O$.

Characters. A colourless, or pale yellow, liquid; odour and taste, those of Caraway.

Tests for Identity and Purity. Soluble in an equal volume of *alcohol (90 per cent.)*, and in 7 volumes of *alcohol (80 per cent.)*; *specific gravity* (15·5°/15·5°), 0·910 to 0·920; *optical rotation*, + 70° to + 80°; *refractive index* at 20°, 1·485 to 1·492.

Assay. Carry out the *method for the determination of carvone.*

Storage. Oil of Caraway should be kept in a well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
0·06 to 0·2 mil.	1 to 3 minims.

OLEUM CARYOPHYLLI

[Ol. Caryoph.]

Oil of Clove

Oil of Clove is the oil distilled from Clove. It contains not less than 85 per cent. v/v, and not more than 90 per cent. v/v, of eugenol, $C_{10}H_{12}O_2$.

Characters. A colourless, or pale yellow, liquid when freshly distilled, darkening with age or on exposure to air; odour and taste, those of Clove.

Tests for Identity and Purity. Soluble in 2 volumes of *alcohol (70 per cent.)*; *specific gravity* (15·5°/15·5°), 1·047 to 1·060; *refractive index* at 20°, 1·528 to 1·537.

Assay. Place 80 millilitres of *solution of potassium hydroxide* in a flask of about 150 millilitres capacity with a long neck, which is graduated in tenths of a millilitre, and is of such a diameter that not less than 15 centimetres in length is equivalent to 10 millilitres. The flask before use must be cleansed with *sulphuric acid* and well rinsed with *water*. Add 10 millilitres of the oil, cleared by filtration if necessary, and shake thoroughly at five minutes intervals for half an hour, at laboratory temperature. Raise the unabsorbed oil into the graduated portion of the neck of the flask by the gradual addition of more of the *solution of potassium hydroxide*; allow to stand for not less than twenty-four hours, and read off the volume of the unabsorbed oil. The unabsorbed oil measures not less than 1·0 millilitre, and not more than 1·5 millilitres, indicating the presence of not less than 85 per cent. v/v, and not more than 90 per cent. v/v, of eugenol.

Storage. Oil of Clove should be kept in a well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
0·06 to 0·2 mil.	1 to 3 minims.

OLEUM CHENOPODII

[Ol. Chenopod.]

Oil of Chenopodium

Synonym. Oil of American Wormseed.

Oil of Chenopodium is the oil distilled with steam from the fresh flowering and fruiting plants, excluding roots, of *Chenopodium ambrosioides* Linn. var. *anthelminticum* Gray. It contains not less than 65 per cent. w/w of ascaridole, $C_{10}H_{16}O_2$.

Characters. A colourless, or pale yellow, liquid; odour, characteristic and unpleasant; taste, bitter and burning.

Tests for Identity and Purity. 1 millilitre, heated to incipient ebullition in a test-tube with a fragment of unglazed porcelain, continues to boil vigorously for some seconds after removal from the flame, and leaves after cooling a deep golden-yellow liquid. (This test should be carried out very cautiously as the oil is liable to explode.)

Soluble in from 3 to 10 volumes of *alcohol* (*70 per cent.*); *specific gravity* (15·5°/15·5°), 0·960 to 0·980; *optical rotation*, − 4° to − 8°; *refractive index* at 20°, 1·474 to 1·479.

Assay. Dissolve about 2·5 grammes, accurately weighed, in sufficient *acetic acid* (*90 per cent.*) to produce 50 millilitres, and place the solution in a burette. Into a stoppered tube, of about 60 millilitres capacity, place 3 millilitres of an 83 per cent. w/v aqueous solution of *potassium iodide*, 5 millilitres of *hydrochloric acid* and 10 millilitres of *glacial acetic acid*; immerse the tube in a freezing mixture until the temperature is reduced to − 3°, then add 5 millilitres of the acetic acid solution of the oil, mixing it with the reagent as quickly as possible, and making due allowance for the draining of the burette. Set aside in a cool place for five minutes and, without diluting, titrate the liberated iodine with *N/10 sodium thiosulphate*. At the same time, carry out the operation without the oil, but dilute the reagent with 20 millilitres of *water* before titrating the liberated iodine. The difference between the two titrations represents the iodine liberated by ascaridole. Each millilitre of *N/10 sodium thiosulphate* is equivalent to 0·00665 gramme of $C_{10}H_{16}O_2$.

Storage. Oil of Chenopodium should be protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
0·2 to 1 mil.	3 to 15 minims.

OLEUM CINNAMOMI

[Ol. Cinnam.]

Oil of Cinnamon

Oil of Cinnamon is the oil distilled from Cinnamon. It contains not less than 50 per cent. w/w, and not more than 65 per cent. w/w, of cinnamic aldehyde, C_9H_8O.

Characters. A yellow liquid when freshly distilled, gradually becoming reddish-brown with age; odour and taste, those of Cinnamon.

Tests for Identity and Purity. Soluble in 3 volumes of *alcohol* (*70 per cent.*), the solution showing not more than a slight opalescence; *specific gravity* (15·5°/15·5°), 1·000 to 1·030; *optical rotation*, 0° to − 2°; *refractive index* at 20°, 1·565 to 1·582.

Dissolve 1 drop in 5 millilitres of *alcohol* (*90 per cent.*), and add 1 drop of *test-solution of ferric chloride*; a slight green, but not a blue or a deep brown, colour may be produced (absence of cinnamon leaf oil, and of cassia oil).

Assay. Carry out the *method for the determination of aldehydes in volatile oils, Oil of Cinnamon.*

Storage. Oil of Cinnamon should be kept in a well-closed container, protected from light, and stored in a cool place.

Preparation. Aqua Cinnamomi Concentrata.

DOSES

Metric.	Imperial.
0·06 to 0·2 mil.	1 to 3 minims.

OLEUM CORIANDRI

[Ol. Coriand.]

Oil of Coriander

Oil of Coriander is the oil distilled from Coriander.

Characters. A colourless, or pale yellow, liquid; odour and taste, those of Coriander.

Tests for Identity and Purity. Soluble in 3 volumes of *alcohol* (*70 per cent.*); *specific gravity* (15·5°/15·5°), 0·870 to 0·884; *optical rotation*, + 8° to + 15°; *refractive index* at 20°, 1·462 to 1·472.

Storage. Oil of Coriander should be kept in a well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
0·06 to 0·2 mil.	1 to 3 minims.

OLEUM EUCALYPTI

[Ol. Eucalyp.]

Oil of Eucalyptus

Oil of Eucalyptus is the oil distilled from the fresh leaves of various species of *Eucalyptus*, and rectified. It contains not less than 70 per cent. w/w of cineole, $C_{10}H_{18}O$.

Characters. A colourless, or pale yellow, liquid; odour, aromatic and camphoraceous; taste, pungent and camphoraceous, followed by a sensation of cold.

Tests for Identity and Purity. Soluble in 5 volumes of *alcohol* (*70 per cent.*); *specific gravity* (15·5°/15·5°), 0·910 to 0·930; *optical rotation*, − 5° to + 5°; *refractive index* at 20°, 1·458 to 1·470.

Mix 1 millilitre with 2 millilitres of *glacial acetic acid* and 5 millilitres of *light petroleum* (*boiling-point, 50° to 60°*), add 2 millilitres of a saturated aqueous solution of *sodium nitrite*, and shake the mixture gently; no crystalline precipitate forms in the upper layer (limit of phellandrene).

Carry out the *method for the determination of aldehydes in volatile oils, Oil of Lemon*, using 10 millilitres of Oil of Eucalyptus with 4 millilitres of *hydroxylamine hydrochloride reagent in alcohol* (*60 per cent.*) and 5 millilitres of *benzene*; not more than 2 millilitres of *N/2 potassium hydroxide in alcohol* (*60 per cent.*) is required (limit of aldehydes).

Assay. Carry out the *method for the determination of cineole*.

Storage. Oil of Eucalyptus should be kept in a well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
0·06 to 0·2 mil.	1 to 3 minims.

OLEUM GOSSYPII SEMINIS

[Ol. Gossyp. Sem.]

Cottonseed Oil

Cottonseed Oil is the fixed oil, obtained from the seeds of various cultivated species of *Gossypium*.

Characters. Pale yellow, or yellow, oil; odourless, or nearly odourless; taste, bland.

Slightly soluble in *alcohol* (*90 per cent.*); miscible with *ether*, with *chloroform*, and with *light petroleum* (*boiling-point, 50° to 60°*).

Test for Identity. Mix in a stout glass tube, having a capacity of not less than 15 millilitres, 2·5 millilitres with 2·5 millilitres of a mixture of equal volumes of *amyl alcohol* and *carbon disulphide*, the latter containing 1 per cent. w/v of *precipitated sulphur* in solution. Close the tube securely, and immerse it to one-third of its depth in boiling water; a reddish colour is produced in from ten to fifteen minutes.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·920 to 0·925; *refractive index* at 40°, 1·4645 to 1·4655; *acid value*, not more than 0·5; *saponification value*, 190 to 198; *iodine value*, 103 to 115.

At a temperature below 12° particles of solid fat begin to separate from the oil, which congeals at temperatures between 0° and − 5°.

Complies with the *test for the absence of sesame oil, and of arachis oil.*

Water, boiled with the oil, does not acquire an alkaline reaction (absence of alkalis).

DOSES

Metric.	**Imperial.**
15 to 30 mils.	**$^1/_2$ to 1 fluid ounce.**

If solid matter has separated out, the oil should be gently warmed until completely liquid, and should be well mixed before it is used.

OLEUM HYDNOCARPI

[Ol. Hydnocarp.]

Hydnocarpus Oil

Hydnocarpus oil is the fatty oil, obtained by cold expression from the fresh, ripe seeds of *Hydnocarpus Wightiana* Blume.

Characters. A yellowish, or brownish-yellow, oil, or soft cream-coloured fat; odour, slight and characteristic; taste, somewhat acrid.

Partially insoluble in cold *alcohol* (*90 per cent.*); almost wholly soluble in hot *alcohol* (*90 per cent.*); miscible with *ether*, with *chloroform*, and with *carbon disulphide.*

Tests for Purity. *Specific gravity* (25°/25°), 0·950 to 0·960; *melting-point*, 20° to 25°; *specific rotation* in a solution made by dissolving 10 grammes of oil in *chloroform* and diluting to 100 millilitres with the same solvent, not less than + 53°; *refractive index* at 40°, 1·472 to 1·476; *acid value*, not more than 25; *saponification value*, 198 to 204; *iodine value*, 97 to 103.

Storage. Hydnocarpus Oil should be kept in a well-closed container, protected from light, and stored in a cool place.

Preparation. Oleum Hydnocarpi Aethylicum.

DOSES

Metric.	**Imperial.**
0·3 to 1 mil, increasing gradually to 4 mils.	**5 to 15 minims, increasing gradually to 60 minims.**
By subcutaneous and intramuscular injection.	
2 mils, increasing gradually to 5 mils.	**30 minims, increasing gradually to 75 minims.**

OLEUM HYDNOCARPI AETHYLICUM

[Ol. Hydnocarp. Aeth.]

Ethyl Esters of Hydnocarpus Oil

Ethyl Esters of Hydnocarpus Oil consists mainly of the ethyl esters of chaulmoogric and hydnocarpic acids, and is produced by esterifying the fatty acids of hydnocarpus oil with ethyl alcohol, or with Industrial Methylated Spirit, the crude product being subsequently washed with a solution of sodium carbonate to remove fatty acids, and finally purified by distillation under reduced pressure.

Characters. A colourless, or faintly yellow, limpid oil; odour, characteristic; taste, slightly acrid.

Soluble in not less than 6 volumes of cold *alcohol* (*90 per cent.*); miscible with *ether*, with *chloroform*, and with *carbon disulphide.*

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), 0·905 to 0·910; *optical rotation*, not less than + 45°; *refractive index* at 20°, 1·458 to 1·462; *acid value*, not greater than 1·0; *saponification value*, 190 to 196; *iodine value*, 88 to 94.

Storage. Ethyl Esters of Hydnocarpus Oil should be kept in a well-closed container, protected from light, and stored in a cool place.

Sterilisation. Ethyl Esters of Hydnocarpus Oil for injection is sterilised by *heating in an autoclave.*

DOSES

Metric.	**Imperial.**
0·3 to 1 mil, increasing gradually to 4 mils.	**5 to 15 minims, increasing gradually to 60 minims.**
By subcutaneous and intramuscular injection.	
2 mils, increasing gradually to 5 mils.	**30 minims, increasing gradually to 75 minims.**

OLEUM LAVANDULÆ

[Ol. Lavand.]

Oil of Lavender

Oil of Lavender is the oil distilled from the fresh flowering tops of *Lavandula officinalis* Chaix. It contains (English oil) not less than 7 per cent. w/w and not more than 14 per cent. w/w, or (foreign oil) not less than 35 per cent. w/w, of esters, calculated as linalyl acetate, $C_{12}H_{20}O_2$.

Characters. A colourless, pale yellow or yellowish-green, liquid; odour, that of the flowers; taste, pungent and slightly bitter.

Tests for Identity and Purity. Soluble in 4 volumes of *alcohol (70 per cent.)*, the solution showing not more than a slight opalescence; *specific gravity* (15·5°/15·5°), (English oil) 0·882 to 0·900, (foreign oil) 0·883 to 0·895; *optical rotation*, (English oil) − 3° to − 10°, (foreign oil) − 3° to − 10°; *refractive index* at 20°, (English oil) 1·459 to 1·470, (foreign oil) 1·459 to 1·464.

Assay. Carry out the *method for the determination of esters in volatile oils.*

Storage. Oil of Lavender should be kept in a well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
0·06 to 0·2 mil.	1 to 3 minims.

OLEUM LIMONIS

[Ol. Limon.]

Oil of Lemon

Oil of Lemon is the oil expressed from Lemon Peel. It contains not less than 4 per cent. w/w of aldehydes, calculated as citral, $C_{10}H_{16}O$.

Characters. A pale yellow, or greenish-yellow, liquid; odour, that of lemons; taste, warm and slightly bitter.

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), 0·857 to 0·861; *optical rotation*, + 57° to + 65°; *refractive index* at 20°, 1·474 to 1·476.

Assay. Carry out the *method for the determination of aldehydes in volatile oils, Oil of Lemon.*

Storage. Oil of Lemon should be kept in a well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
0·06 to 0·2 mil.	1 to 3 minims

OLEUM LINI

[Ol. Lini]

Linseed Oil

Linseed Oil is the fixed oil, obtained from Linseed. "Boiled" linseed oil must not be employed.

Characters. A yellowish-brown oil; odour, characteristic; taste, bland. Gradually thickens on exposure to air, forming, when spread in thin films, a hard transparent varnish.

Slightly soluble in *alcohol* (*90 per cent.*); miscible with *ether*, with *chloroform*, and with *light petroleum* (*boiling-point, 50° to 60°*).

Does not congeal at – 20°.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·930 to 0·940; *refractive index* at 40°, 1·4725 to 1·4750; *acid value*, not more than 5·0; *saponification value*, 187 to 195; *unsaponifiable matter*, not more than 1·5 per cent.; *iodine value*, 170 to 200.

Mix 2 millilitres with 2 millilitres of *acetic anhydride*, warm, shake, cool to 15·5°, and add 2 drops of a cold mixture of 2 parts by weight of *sulphuric acid* and 1 part by weight of *water*; no violet colour is produced (absence of resin and resin oils).

Complies with the *test for the absence of cottonseed oil, of sesame oil, and of arachis oil.*

Metric.	**DOSES**	**Imperial.**
15 to 30 mils.		**½ to 1 fluid ounce.**

OLEUM MENTHÆ PIPERITÆ

[Ol. Menth. Pip.]

Oil of Peppermint

Oil of Peppermint is the oil distilled from the fresh flowering tops of *Mentha piperita* Linn., and rectified, if necessary. It contains not less than 4·5 per cent. w/w, and not more than 9 per cent. w/w, of esters, calculated as menthyl acetate, $C_{12}H_{22}O_2$, and not less than 46 per cent. w/w of free menthol, $C_{10}H_{20}O$.

Characters. A colourless, pale yellow or greenish-yellow, liquid; odour, that of peppermint; taste, pungent and aromatic, followed by a sensation of cold.

Tests for Identity and Purity. Soluble in 4 volumes of *alcohol* (*70 per cent.*), the solution showing not more than a slight opalescence, but becoming less soluble with age; *specific gravity* (15·5°/15·5°), 0·902 to 0·910; *optical rotation*, – 18° to – 32°; *refractive index* at 20°, 1·460 to 1·470.

Mix in a dry test-tube 3 drops of the oil with 5 millilitres of a solution of 1 volume of *nitric acid* in 300 volumes of *glacial acetic acid,* and place the tube in a beaker of boiling water. In from one to five minutes a blue colour develops, which, on continued heating, deepens and shows a copper coloured fluorescence, and then fades, leaving a golden yellow solution (distinction from Japanese mint oil).

Assay. Carry out the *method for the determination of esters, and of free alcohols, in volatile oils.*

Storage. Oil of Peppermint should be kept in a well-closed container, protected from light, and stored in a cool place.

Preparations. Aqua Menthæ Piperitæ Concentrata.
Aqua Menthæ Piperitæ Destillata.
Spiritus Menthæ Piperitæ.

DOSES

Metric.	**Imperial.**
0·06 to 0·2 mil.	**1 to 3 minims.**

OLEUM MORRHUÆ

[Ol. Morrh.]

Cod-liver Oil

Cod-liver Oil is the fixed oil, expressed from the fresh liver of the cod, *Gadus morrhua* Linn., and freed from solid fat by filtration at about 0°.

Characters. A pale yellow liquid; odour, slightly fishy, but not rancid; taste, bland and slightly fishy.

Slightly soluble in *alcohol* (*90 per cent.*); miscible with *ether,* with *chloroform,* and with *light petroleum* (*boiling-point, 50° to 60°*).

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·922 to 0·929; *refractive index* at 40°, 1·4705 to 1·4745; *acid value,* not greater than 1·2; *saponification value,* 180 to 190; *unsaponifiable matter,* not more than 1·5 per cent.; *iodine value,* 155 to 173.

Remains bright when cooled to 0° and kept at that temperature for three hours.

Complies with the *antimony trichloride test for cod-liver oil.*

Storage. Cod-liver Oil should be kept in a well-filled, well-closed container, and protected from light.

Preparation. Extractum Malti cum Oleo Morrhuæ.

DOSES

Metric.	**Imperial.**
2 to 8 mils.	**30 to 120 minims.**

When a statement is made of the number of units of Vitamin D in Cod-liver Oil, the units enumerated should be the Units described under the *biological assay of antirachitic vitamin* (*vitamin D*).

OLEUM MYRISTICÆ

[Ol. Myrist.]

Oil of Nutmeg

Oil of Nutmeg is the oil distilled from Nutmeg.

Characters. A colourless, or pale yellow, liquid; odour and taste, those of Nutmeg.

Tests for Identity and Purity. Soluble in 3 volumes of *alcohol* (*90 per cent.*); *specific gravity* (15·5°/15·5°), 0·880 to 0·925; *optical rotation*, + 10° to + 30°; *refractive index* at 20°, 1·474 to 1·488.

2 grammes leaves, when evaporated rapidly in a flat dish on a water-bath, not more than 0·060 gramme of residue.

Storage. Oil of Nutmeg should be kept in a well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	**Imperial.**
0·06 to 0·2 mil.	**1 to 3 minims.**

OLEUM OLIVÆ

[Ol. Oliv.]

Olive Oil

Olive Oil is the fixed oil, expressed from the ripe fruits of *Olea europæa* Linn.

Characters. A pale yellow, or greenish-yellow, liquid; odour, slight, but not rancid; taste, bland.

Slightly soluble in *alcohol* (*90 per cent.*); miscible with *ether*, with *chloroform*, and with *light petroleum* (*boiling-point, 50° to 60°*).

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·915 to 0·918; *refractive index* at 40°, 1·4605 to 1·4635; *acid value*, not more than 2·0; *saponification value*, 190 to 195; *iodine value*, 79 to 88.

Complies with the *test for the absence of cottonseed oil, of sesame oil, and of arachis oil.*

DOSES

Metric.	**Imperial.**
15 to 30 mils.	**$^1/_2$ to 1 fluid ounce.**

Olive Oil, conforming to the above characters and tests, but possessing an *acid value* not exceeding 6·0, may be employed in making the official liniments, ointments, and plasters, for which it is directed that Olive Oil be used.

OLEUM RICINI

[Ol. Ricin.]

Castor Oil

Castor Oil is the fixed oil, expressed from the seeds of *Ricinus communis* Linn.

Characters. A nearly colourless, or pale yellow, viscid liquid; odour, slight; taste, at first bland, but afterwards slightly acrid.

Soluble in 3·5 parts of *alcohol* (*90 per cent.*); miscible with *dehydrated alcohol*, and with *glacial acetic acid.*

Tests for Identity. Mixes completely with half its volume of *light petroleum* (*boiling-point, 50° to 60°*), and is only partially soluble in two volumes. Yields a clear liquid with an equal volume of *dehydrated alcohol.*

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·958 to 0·969; *refractive index* at 40°, 1·4695 to 1·4730; *acid value*, not more than 4·0; *saponification value*, 177 to 187; *iodine value*, 82 to 90; *optical rotation*, not less than + 3·5°.

Remains bright when cooled to 0° and kept at that temperature for three hours.

DOSES

Metric.	**Imperial.**
4 to 16 mils.	**60 to 240 minims.**

OLEUM ROSMARINI

[Ol. Rosmarin.]

Oil of Rosemary

Oil of Rosemary is the oil distilled from the flowering plant, *Rosmarinus officinalis* Linn. It contains not less than 2 per cent. w/w of esters, calculated as bornyl acetate, $C_{12}H_{20}O_2$, and not less than 9 per cent. w/w of free alcohols, calculated as borneol, $C_{10}H_{18}O$.

Characters. A colourless, or pale yellow, liquid; odour, that of rosemary; taste, warm and camphoraceous.

Tests for Identity and Purity. Soluble in an equal volume of *alcohol* (*90 per cent.*), and in 10 volumes of *alcohol* (*80 per cent.*); *specific gravity* (15·5°/15·5°), 0·900 to 0·919; *optical rotation*, − 5° to + 10°; *refractive index* at 20°, 1·464 to 1·476.

The *freezing-point* of a mixture of 1·5 grammes of the oil, 1·5 grammes of Eucalyptol and 2·1 grammes of *ortho-cresol*, determined by the *method for the determination of cineole*, is not higher than 39° (limit of cineole).

Assay. Carry out the *method for the determination of esters, and of free alcohols, in volatile oils.*

Storage. Oil of Rosemary should be kept in a well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
0·06 to 0·2 mil.	**1 to 3 minims.**

OLEUM SANTALI

[Ol. Santal.]

Oil of Sandal Wood

Oil of Sandal Wood is the oil distilled from the dried heartwood of *Santalum album* Linn. It contains not less than 2 per cent. w/w of esters, calculated as santalyl acetate, $C_{17}H_{26}O_2$, and not less than 90 per cent. w/w of free alcohols, calculated as santalol, $C_{15}H_{24}O$.

Characters. A pale yellow, or nearly colourless, viscous liquid; odour, aromatic and that of the wood; taste, unpleasant.

Tests for Identity and Purity. Soluble at 20° in 5 volumes of *alcohol (70 per cent.)*; *specific gravity* (15·5°/15·5°), 0·973 to 0·985; *optical rotation*, − 15° to − 20°; *refractive index* at 20°, 1·500 to 1·510.

Assay. Carry out the *method for the determination of esters, and of free alcohols, in volatile oils.*

Storage. Oil of Sandal Wood should be kept in a well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
0·3 to 1 mil.	**5 to 15 minims.**

OLEUM SANTALI AUSTRALIENSIS

[Ol. Santal. Austral.]

Oil of Australian Sandal Wood

Oil of Australian Sandal Wood is the oil distilled from the wood of *Eucarya spicata* Sprague and Summerhayes (syn. *Santalum spicatum*), and rectified. It contains not less than 90 per cent. w/w of free alcohols, calculated as $C_{15}H_{24}O$.

Characters. A colourless, or pale yellow, oily liquid; odour, characteristic and that of the wood; taste, unpleasant.

Tests for Purity. Soluble at 20° in 3 to 6 volumes of *alcohol (70 per cent.)*; *specific gravity* (15·5°/15·5°), 0·970 to 0·976; *optical rotation*, − 3° to − 10°; *refractive index* at 20°, 1·498 to 1·508.

Assay. Carry out the *method for the determination of free alcohols in volatile oils.*

Storage. Oil of Australian Sandal Wood should be kept in a well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
0·3 to 1 mil.	**5 to 15 minims.**

OLEUM SESAMI

[Ol. Sesam.]

Sesame Oil

Sesame Oil is the fixed oil, expressed from the seeds of *Sesamum indicum* Linn.

Characters. A pale yellow liquid; odour, slight; taste, bland. Does not solidify when cooled to 0°.

Slightly soluble in *alcohol (90 per cent.)*: miscible with *ether*, with *chloroform*, and with *light petroleum (boiling-point, 50° to 60°)*.

Test for Identity. Shake 2 millilitres with 1 millilitre of *hydrochloric acid*, containing 1 per cent. w/v of *sucrose*, and allow to stand for five minutes; the acid layer acquires a deep pink colour.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·921 to 0·924; *refractive index* at 40°, 1·4650 to 1·4665; *acid value*, not more than 4·0; *saponification value*, 188 to 193; *iodine value*, 103 to 112.

Complies with the *test for the absence of cottonseed oil, and of arachis oil.*

DOSES

Metric.	Imperial.
15 to 30 mils.	**1/2 to 1 fluid ounce.**

OLEUM TEREBINTHINÆ

[Ol. Terebinth.]

Oil of Turpentine

Synonyms. Oleum Terebinthinæ Rectificatum: Rectified Oil of Turpentine.

Oil of Turpentine is the oil distilled from the oleo-resin, turpentine, obtained from various species of *Pinus*, and rectified.

Characters. A colourless, limpid liquid; odour, characteristic; taste, pungent and somewhat bitter.

Soluble in 7 volumes of *alcohol* (*90 per cent.*), and in all proportions of *alcohol* (*95 per cent.*), of *ether*, of *chloroform*, and of *glacial acetic acid*.

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), 0·860 to 0·870; *refractive index* at 20°, 1·467 to 1·477; *iodine value*, not less than 340, as determined by the following method:—Weigh accurately and rapidly about 0·1 gramme (0·095 to 0·105 gramme) into a glass tube about 12 millimetres long, which has an internal diameter of 5 millimetres, and is sealed and flattened at one end; drop this tube and its contents into a dry stoppered vessel, add 10 millilitres of *carbon tetrachloride*, and 30 millilitres of *solution of iodine monochloride*. Shake thoroughly, and set aside in a dark place at laboratory temperature for exactly one hour, add 15 millilitres of *solution of potassium iodide*, and proceed as directed for the *determination of the iodine value of fixed oils and fats*. Use 30 millilitres of *solution of iodine monochloride* for the determination without the Oil of Turpentine.

2 grammes leaves, when evaporated rapidly in a flat dish on a waterbath, not more than 0·01 gramme of residue.

Storage. Oil of Turpentine should be kept in a well-closed container, protected from light, and stored in a cool place.

Preparations. Linimentum Terebinthinæ.
Linimentum Terebinthinæ Aceticum.

DOSES

Metric.	**Imperial.**
0·2 to 0·6 mil.	**8 to 10 minims.**
Anthelmintic dose	
8 to 16 mils.	**120 to 240 minims.**

OLEUM THEOBROMATIS

[Ol. Theobrom.]

Oil of Theobroma

Synonyms. Cocoa Butter: Cacao Butter.

Oil of Theobroma is the solid fat, expressed from the roasted seeds of *Theobroma Cacao* Linn.

Characters. A yellowish-white, solid fat; odour, slight, agreeable, and resembling that of cocoa; taste, bland and characteristic. Somewhat brittle, but softens at 25°.

Slightly soluble in *alcohol* (*90 per cent.*); freely soluble in *ether*, in *chloroform*, and in *light petroleum* (*boiling-point, 50° to 60°*).

Tests for Purity. *Melting-point*, 30° to 35°; *refractive index* at 40°, 1·4565 to 1·4575; *acid value*, not more than 4·0; *saponification value*, 188 to 195; *iodine value*, 35 to 40.

Dissolve 1 gramme in 3 millilitres of *ether* in a test-tube at a temperature of 17°, and place the tube in water at 0°; the solution does not show any deposit in less than three minutes; after it has congealed, expose it to a temperature of 15·5°; the solution is not more than slightly turbid (absence of wax, of stearin, and of tallow).

OPIUM

[Opium]

Opium

Opium is the latex, obtained by incision from the unripe capsules of *Papaver somniferum* Linn., and inspissated by spontaneous evaporation. It contains, in its moist condition, as imported, not less than 9·5 per cent. of morphine, calculated as anhydrous morphine.

Characters. More or less rounded, usually somewhat flattened masses, varying in weight, but commonly weighing between 250 and 1000 grammes; covered with portions of poppy leaves, and usually with fruits of species of *Rumex* adhering to the masses. Plastic when fresh, becoming, on keeping, hard and tough or occasionally brittle. Internally, dark brown and coarsely granular or nearly smooth. Odour, strong and characteristic; taste, bitter.

In the residue, left after exhaustion with *water*, a few fragments of the outer epidermis of the poppy capsule, with thick-walled, polygonal or elongated epidermal cells, are present, also a very few fragments of the tissues of poppy leaves, of poppy capsules and of the fruits of *Rumex*, and occasional starch grains are usually found.

Assay. Triturate 8 grammes, accurately weighed, in a mortar with 10 millilitres of *water*, until a perfectly uniform mixture is produced. Add a further 20 millilitres of *water* and 2·0 grammes of *calcium hydroxide*, and mix very thoroughly. Transfer the mixture to a tared flask, rinsing the mortar with successive small quantities of *water* sufficient to produce 90 grammes. Stopper the flask, and shake occasionally during half an hour. Filter, and collect 52 millilitres of the filtrate, representing 5 grammes of the opium being assayed. Transfer to a small conical flask, add 5 millilitres of *alcohol (90 per cent.)* and 25 millilitres of *ether*, stopper the flask, shake, add 2·0 grammes of *ammonium chloride*, shake for five minutes and then occasionally during about half an hour, making the total time of shaking about fifteen minutes. Allow to stand overnight. Decant the ethereal layer as completely as possible into a funnel, fitted with a tightly packed plug of cotton wool, rinse the flask and its contents with a further 10 millilitres of *ether*, and again decant through the filter. Wash the filter with 5 millilitres of *ether*, added slowly and in portions, and pour the aqueous liquid into the filter, without attempting to remove all the crystals. When all the liquid has passed through, wash the flask and filter with *morphinated water*, until the filtrate is free from chloride. Wash the crystals on the filter back into the flask, add 20 millilitres of *N/10 sulphuric acid*, boil, cool, and titrate the excess of acid with *N/10 sodium hydroxide*, using *tincture of cochineal*, or *solution of methyl red*, as indicator. Each millilitre of *N/10 sulphuric acid* is equivalent to 0·02852 gramme of anhydrous morphine. To the amount indicated by the titration add 0·052 gramme, in order to correct for loss of morphine due to its solubility.

Preparations. Extractum Opii Siccum.
Opium Pulveratum.
  Pulvis Cretæ Aromaticus cum Opio.
  Pulvis Ipecacuanhæ et Opii.
  Suppositorium Plumbi cum Opio.
Tinctura Opii.
  Tinctura Opii Camphorata.

When Opium is prescribed, Opium Pulveratum shall be dispensed.

OPIUM PULVERATUM

[Opium Pulverat.]

Powdered Opium

Synonym. Pulvis Opii.

Powdered Opium is Opium, dried at a moderate temperature, reduced to a *fine* or *moderately fine powder*, and adjusted, if necessary, by the addition of powdered Lactose, to contain 10 per cent. of morphine, calculated as anhydrous morphine (limits, 9·5 to 10·5).

Characters. A light brown powder, consisting of yellowish-brown or brownish-red particles; odour and taste, characteristic of Opium.

The residue, left after extraction with *water*, exhibits the structural elements mentioned under 'Opium'.

Assay. Carry out the Assay as described under 'Opium'.

Storage. Powdered Opium should be kept in a well-closed container.

Preparations. Pulvis Cretæ Aromaticus cum Opio.
Pulvis Ipecacuanhæ et Opii.
Suppositorium Plumbi cum Opio.

DOSES

Metric.	Imperial.
0·03 to 0·2 gramme.	$^1/_2$ to 3 grains.

Powdered Opium contains in 0·2 gramme 0·02 gramme, and in 3 grains $^3/_{10}$ grain of morphine, calculated as anhydrous morphine.

ORTHOCAINA

[Orthocain.]

Orthocaine

$HO{\cdot}C_6H_3(NH_2)CO_2{\cdot}CH_3$ $[HO : NH_2 : CO_2{\cdot}CH_3 = 4 : 3 : 1]$
Mol. Wt. 167·1

Orthocaine is the methyl ester of *m*-amino-*p*-hydroxybenzoic acid, and may be prepared by esterifying with methyl alcohol the reduction product of 3-nitro-4-hydroxybenzoic acid.

Characters. A white, or faintly yellow, crystalline powder; odourless; tasteless.

Sparingly soluble in *water*; soluble in 7 parts of *alcohol (90 per cent.)*, and in 50 parts of *ether*; readily soluble in *solution of sodium hydroxide.*

Tests for Identity. A saturated, filtered solution in *water* gives a fugitive red colour with *solution of ferric chloride.*

A solution of 0·1 gramme in 2 millilitres of *water*, with the addition of a few drops of *hydrochloric acid*, is coloured yellowish on the addition of a 10 per cent. w/v aqueous solution of *sodium nitrite*, and deposits an orange-yellow precipitate, which becomes intensely red on contact with air.

A solution in *dilute hydrochloric acid* yields no precipitate with *solution of iodine* (distinction from benzocaine), and no precipitate with *solution of potassio-mercuric iodide* (distinction from procaine hydrochloride and amylocaine hydrochloride).

Tests for Purity. *Melting-point*, 141° to 143°.

A solution of 1 gramme in 10 millilitres of *alcohol* (*90 per cent.*) is clear, colourless, or at most faintly yellow, and is neutral to *litmus*.

Shake 1 gramme with 10 millilitres of *water*, filter, acidify with *nitric acid*, and add 1 millilitre of *solution of silver nitrate*; no opalescence, or precipitate, is produced (absence of chlorides).

0·2 gramme loses, on drying at 100°, not more than 0·002 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

DOSES

Metric.	**Imperial.**
0·1 to 0·2 gramme.	**$1^1/_2$ to 3 grains.**

OXYGENIUM

[Oxygen.]

Oxygen

O . . . . . At. Wt. 16

Oxygen may be prepared by the fractional distillation of liquid air, or by the electrolysis of water. It contains not less than 98 per cent. v/v of O_2. The residue consists either of argon with a trace of nitrogen, or of hydrogen. For convenience in use it is compressed in metal cylinders.

Characters. A colourless gas; odourless; tasteless.

One volume dissolves in about 43 volumes of *water*, and in 3·6 volumes of *alcohol* (*95 per cent.*).

Tests for Identity. A glowing splinter of wood bursts into flame on being plunged into the gas.

When mixed with an equal volume of *nitric oxide*, red fumes are produced (distinction from nitrous oxide).

Tests for Purity. Pass a volume equivalent to 500 millilitres, measured at normal temperature and pressure, through 100 millilitres of *solution of barium hydroxide* at a rate not exceeding 4 litres per hour; the turbidity produced is not greater than that produced by adding 1 millilitre of a solution, prepared by dissolving 0·2 gramme of *sodium bicarbonate* in 100 millilitres of freshly boiled and cooled *water*, to 100 millilitres of *solution of barium hydroxide* (limit of carbon dioxide).

Pass a volume equivalent to 2 litres, measured at normal temperature and pressure, through a mixture of 100 millilitres of *water* and 1 millilitre of *solution of silver nitrate*; no opalescence is produced (limit of halogens).

Pass a volume equivalent to 2 litres, measured at normal temperature and pressure, through 100 millilitres of *water* coloured with a few drops of *solution of litmus*; the colour of the liquid is not changed (limit of acids or alkalis).

Pass a volume equivalent to 2 litres, measured at normal temperature and pressure, through a freshly prepared solution of 0·5 gramme of *soluble starch* and 0·5 gramme of *potassium iodide* in 100 millilitres of *water*; the colour of the liquid is not changed (limit of oxidising substances).

Assay. Shake in a calibrated tube about 50 millilitres, accurately measured, with 10 millilitres of *alkaline solution of pyrogallol*; not less than 98 per cent. v/v is absorbed.

OXYMEL

[Oxymel.]

Oxymel

Acetic Acid	150 millilitres
Distilled Water . . .	150 millilitres
Purified Honey, sufficient to produce	1000 millilitres

Mix thoroughly.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 1·258 to 1·263; *optical rotation* at 20° of a 25 per cent. w/v solution in *water*, decolourised, if necessary, by means of *decolourising charcoal*, + 0·6° to − 1·9°.

10 millilitres, diluted with 10 millilitres of *water*, requires for neutralisation not less than 8·3 millilitres, and not more than 8·8 millilitres, of *N/1 sodium hydroxide*, using *solution of phenolphthalein* as indicator (limits of acidity).

DOSES

Metric.	**Imperial.**
2 to 8 mils.	**30 to 120 minims.**

OXYMEL SCILLÆ

[Oxymel. Scill.]

Oxymel of Squill

Oxymel of Squill contains active constituents approximately equivalent to 5 per cent. w/v. of Squill.

Squill, bruised	50 grammes
Acetic Acid	90 millilitres
Distilled Water	250 millilitres
Purified Honey . .	a sufficient quantity

Macerate for seven days, with occasional agitation, the Squill with the Acetic Acid and the Distilled Water. Drain off the liquid; press the marc; mix the two liquids; heat to boiling; filter, while hot. When the liquid is cold, to every three volumes add seven volumes of Purified Honey. Mix thoroughly.

Tests for Purity. *Specific gravity* (15·5°/15·5°), about 1·27; *optical rotation* at 20° of a 25 per cent. w/v solution in *water*, decolourised, if necessary, by means of *decolourising charcoal*, + 0·6° to − 1·9°.

20 millilitres, diluted with 20 millilitres of *water*, requires for neutralisation not less than 8·0 millilitres, and not more than 9·0 millilitres, of *N/1 sodium hydroxide*, *solution of phenolphthalein* being used as indicator (limits of acidity).

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

PANCREATINUM

[Pancreatin.]

Pancreatin

Pancreatin is a preparation of the pancreas, containing the enzymes, trypsin, amylase, and lipase. It may be prepared from the fresh pancreas of certain animals commonly employed for food, by extraction of one part of pancreas with four parts of Alcohol (25 per cent.). It possesses not less than the minimum activity in respect of trypsin, lipase, and amylase required by the Assay described below.

Characters. A colourless, or buff-coloured, amorphous powder; odour, meaty.

Soluble in *water*, forming a slightly turbid solution; insoluble in *alcohol (90 per cent.)*, and in *ether*.

Tests for Identity. The proteolytic activity is rapidly destroyed in acid solution (distinction from pepsin), and all enzymic activity is destroyed by boiling an aqueous solution.

Dissolve 1 gramme in *water*, adjust the *reaction* to pH 8·0 by the addition of *N/1 sodium hydroxide*, using *cresol red* as indicator, and divide the solution into two portions; boil one portion to destroy the enzyme. To each portion add a few shreds of *Congo-red fibrin*, and place in a thermostat at 38° to 40° for one hour; the unboiled liquid is stained red, the boiled liquid remains colourless.

Assay. *For trypsin.* Dilute fresh milk, of *specific gravity* (15·5°/15·5°) 1·030 to 1·034, with 2 volumes of *water*, and centrifuge for ten minutes at 2000 revolutions per minute. Gently dislodge the clot of cream, and pour off the layer of diluted skimmed milk through muslin. Standardise the protein content of the diluted skimmed milk by the following process:—Neutralise 50 millilitres to *phenolphthalein* with *N/20 sodium hydroxide* and add 5 millilitres of *solution of formaldehyde*, previously neutralised to *phenolphthalein* with *N/20 sodium hydroxide*; 4·9 to 5·1 millilitres of *N/20 sodium hydroxide* should be required to restore the mixture to neutrality to *phenolphthalein*. If more alkali is required, dilute the skimmed milk further with *water*, until it complies with this test.

Place 50 millilitres of this milk in each of two flasks A and B; adjust the *reaction* to *p*H 8·0 by the addition of *N/20 sodium hydroxide*, using *solution of phenol red* as an external indicator. Boil the contents of flask A, which is to serve as a control; boil a solution of 0·05 gramme of the pancreatin being assayed in 10 millilitres of *water*, and add it to flask A. To flask B add 0·05 gramme of the pancreatin being assayed, dissolved in 10 millilitres of *water*, and mix. Bring the temperature of both solutions rapidly to 40°, and place the flasks in a thermostat at 38° to 40° for one-and-a-half hours. Cool the solutions rapidly to 20°, neutralise with *N/20 sodium hydroxide*, using *solution of phenolphthalein* as indicator; add, to each, 5 millilitres of *solution of formaldehyde*, previously neutralised to *phenolphthalein* with *N/20 sodium hydroxide*, and again titrate with *N/20 sodium hydroxide*, using *solution of phenolphthalein* as indicator; flask A requires not less than 4·9 millilitres, and not more than 5·1 millilitres, and flask B not less than 9·0 millilitres, and not more than 13 millilitres, of *N/20 sodium hydroxide*. If more than 13 millilitres is required, the indication of the titration is inaccurate; in order to make an accurate determination, repeat the operation, using such smaller amount of pancreatin as shall bring the final titration figure within the specified limits.

For lipase. Centrifuge some fresh milk, of *specific gravity* (15·5°/15·5°) 1·030 to 1·034, for ten minutes at 2000 revolutions per minute; gently dislodge the clot of cream, and pour off the skimmed milk. Suspend the cream in a solution of *N/10 sodium carbonate*, containing 0·2 millilitre of *oleic acid* per 100 millilitres, making the final volume equal to that of the original milk. Adjust the *reaction* of the suspension to *p*H 8·0 by the cautious addition of *dilute acetic acid*; place 10 millilitres of the suspension in each of two test-tubes A and B. Prepare a solution of 0·1 gramme of the pancreatin being assayed in 10 millilitres of *water*. To tube A add one millilitre of the solution; to tube B add 1 millilitre of the solution, previously boiled; bring the temperature of both solutions rapidly to 40°, and place the tubes in a thermostat at 38° to 40°. After four hours add to the liquid in each of the tubes an equal volume of *alcohol (90 per cent.)* and two drops of *solution of phenolphthalein.* Titrate with *N/20 sodium hydroxide*; the difference between the figures for the two titrations is not less than 1·0 millilitre.

For amylase. Suspend 1 gramme of *soluble starch* in five millilitres of *water,* and pour the suspension into 75 millilitres of boiling *water*; dissolve 5 grammes of *sodium chloride* in the starch solution, and make up to 100 millilitres with *water.* Dilute 10 millilitres of this diluted solution to 100 millilitres with *water,* and place 5 millilitres of this liquid in each of six test-tubes. Prepare a solution of 0·1 gramme of the pancreatin being assayed in 500 millilitres of *water,* and of this solution add 0·35, 0·40, 0·45, 0·50, 0·55 and 0·6 millilitres to the six tubes respectively. Place the tubes in a thermostat at 40° for one hour. Remove the tubes from the thermostat, cool rapidly to 20°, and add one drop of *N/50 iodine* to each; the tubes containing 0·5 millilitre and upwards of the solution, representing 0·0001 gramme or more of the pancreatin being assayed, show no blue colour, indicating complete digestion of the starch.

If each of the three assays shows an activity in excess of that demanded, the Pancreatin may be diluted by admixture with Lactose, so long as the diluted product still complies with all three assays.

Storage. Pancreatin should be kept in a well-closed container, and stored in a cool place.

DOSES

Metric.	**Imperial.**
0·2 to 0·6 gramme.	**3 to 10 grains.**

PARAFFINUM DURUM

[Paraff. Dur.]

Hard Paraffin

Hard Paraffin is a mixture of solid hydrocarbons, obtained from petroleum, and from shale oil.

Characters. A colourless or white, translucent mass, frequently showing a crystalline structure; odourless, even when freshly cut; tasteless; slightly greasy to the touch. Burns with a luminous flame.

Insoluble in *water,* and in cold *alcohol (90 per cent.)*; soluble in *ether,* and in *chloroform.*

Tests for Purity. *Melting-point,* 50° to 60°.

Melt 5 grammes, and shake with 5 millilitres of warm *alcohol (90 per cent.)*; the alcohol is not acid to *litmus* (limit of acidity).

Leaves, on incineration, not more than 0·05 per cent. of residue.

PARAFFINUM LIQUIDUM

[Paraff. Liq.]

Liquid Paraffin

Liquid Paraffin is a mixture of liquid hydrocarbons, obtained from petroleum.

Characters. A transparent, colourless, oily liquid, free from fluorescence by daylight; almost odourless and tasteless.

Insoluble in *water,* and in *alcohol (90 per cent.)*; soluble in *ether,* and in *chloroform.*

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·880 to 0·895; *viscosity,* 50 millilitres at 37·8° flows from a Redwood Viscometer in not less than 260 seconds.

Remains clear, when dried, cooled to 0° and kept at that temperature for four hours (limit of solid paraffins).

Place 3 millilitres with 3 millilitres of *nitrogen-free sulphuric acid* in a test-tube, previously rinsed with the acid, and heat, with frequent shaking, in a boiling water-bath for ten minutes; no colour deeper than pale brown is produced.

Mix 4 millilitres with 2 millilitres of *dehydrated alcohol* and 2 drops of a clear saturated solution of *lead monoxide* in *solution of sodium hydroxide,* and heat at 70° for ten minutes with frequent shaking; the mixture remains colourless (limit of sulphur compounds).

Boil 3 millilitres with 10 millilitres of *alcohol (90 per cent.)*; the alcohol is not acid to *litmus* (limit of acidity).

DOSES

Metric.	Imperial.
7·5 to 30 mils.	1/4 to 1 fluid ounce.

PARAFFINUM MOLLE ALBUM

[Paraff. Moll. Alb.]

White Soft Paraffin

White Soft Paraffin is a mixture of semi-solid hydrocarbons, obtained from petroleum, and bleached.

Characters. A white, translucent, soft mass, unctuous to the touch, not more than slightly fluorescent by daylight, even when melted; odourless, when rubbed on the skin; tasteless.

Tests for Purity. *Refractive index* at 60°, 1·453 to 1·460; *melting-point*, 40° to 46°.

In other respects White Soft Paraffin has the Characters, and complies with the Tests for Purity, described under 'Paraffinum Molle Flavum'.

PARAFFINUM MOLLE FLAVUM

[Paraff. Moll. Flav.]

Yellow Soft Paraffin

Yellow Soft Paraffin is a mixture of semi-solid hydrocarbons, obtained from petroleum.

Characters. A pale yellow to yellow, translucent, soft mass, unctuous to the touch, not more than slightly fluorescent by daylight, even when melted. Free, or nearly free, from odour and taste.

Insoluble in *water*, and in *alcohol* (*90 per cent.*); soluble in *ether*, and in *chloroform*.

Tests for Purity. *Refractive index* at 60°, 1·460 to 1·474; *melting-point*, 38° to 46°.

Volatilises, when heated, without emitting an acrid odour.

Boil 5 grammes with 10 millilitres of *alcohol* (*90 per cent.*); the alcohol is not coloured yellow, and is not acid to *litmus*.

Boil 10 grammes with 20 millilitres of *solution of sodium hydroxide* for ten minutes, and allow the aqueous layer to separate; the aqueous layer yields no precipitate or oily matter, when acidified with *sulphuric acid* (absence of fixed oils, of soaps, and of resin).

Leaves, on incineration, not more than 0·05 per cent. of residue.

PARALDEHYDUM

[Paraldehyd.]

Paraldehyde

$C_6H_{12}O_3$ . . . . . Mol. Wt. 132·1

Paraldehyde may be prepared by the polymerisation of acetaldehyde.

Characters. A colourless, transparent liquid; odour, strong and characteristic; taste, disagreeable.

At a low temperature it solidifies to form a crystalline mass.

Soluble in 9 parts of *water*; miscible with *alcohol* (*90 per cent.*), with *ether*, with *chloroform*, and with volatile oils.

Tests for Identity. Heated with *dilute sulphuric acid*, it gives off the odour of acetaldehyde.

On warming a saturated aqueous solution with *solution of silver ammonio-nitrate* in a test-tube, metallic silver is deposited as a mirror on the sides of the tube.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·998 to 1·000; *boiling-point*, not more than 10 per cent. v/v distils below 123°, and the remainder distils between 123° and 126°; *melting-point*, not below 11°.

5 millilitres mixed with 50 millilitres of freshly boiled and cooled *water*, requires for neutralisation not more than 1·5 millilitres of *N/10 sodium hydroxide*, *solution of phenolphthalein* being used as indicator (limit of acidity).

5 millilitres, shaken with 5 millilitres of *alcohol* (*60 per cent.*) and 5 millilitres of *hydroxylamine hydrochloride reagent in alcohol* (*60 per cent.*) and 2 drops of *solution of methyl orange*, requires for neutralisation, to the full yellow colour of the indicator, not more than 0·8 millilitre of *N/2 sodium hydroxide* (limit of acetaldehyde).

Dissolve in a stoppered bottle 5 millilitres in 75 millilitres of recently boiled and cooled *water*, add 5 millilitres of *dilute sulphuric acid* and 10 millilitres of *solution of potassium iodide*. Set aside in a dark place for fifteen minutes; titrate with *N/10 sodium thiosulphate*; set aside for five minutes, and complete the titration; not more than 2 millilitres is required (limit of peroxidised compounds).

Storage. Paraldehyde should be kept in a small well-filled bottle, protected from light, and stored in a cool place. When it solidifies, the whole of the contents of the bottle should be liquefied before use.

DOSES

Metric.	**Imperial.**
2 to 8 mils.	**30 to 120 minims.**

PASTA ZINCI OXIDI COMPOSITA

[Past. Zinc. Oxid. Co.]

Compound Paste of Zinc Oxide

Synonym. Zinc Paste.

Zinc Oxide, finely sifted . . .	250 grammes
Starch, finely sifted . . .	250 grammes
White Soft Paraffin . . .	500 grammes

Melt the White Soft Paraffin; incorporate the Zinc Oxide and Starch; stir until cool.

PELLETIERINÆ TANNAS

[Pellet. Tann.]

Pelletierine Tannate

Pelletierine Tannate is a mixture of the tannates of the alkaloids, obtained from the bark of the root and stem of *Punica Granatum* Linn.

Characters. A light yellow, amorphous, powder; odourless; taste, astringent.

Slightly soluble in *water*; soluble in *alcohol* (*90 per cent.*).

Tests for Identity. When heated, it becomes brown at about 150°, softens at about 165°, and at a higher temperature decomposes without melting.

A saturated aqueous solution is acid to *litmus*, and yields, with *test-solution of ferric chloride*, a bluish-black colour.

Tests for Purity. A cold solution of about 0·1 gramme in a mixture of 4 millilitres of *water* and 1 millilitre of *dilute hydrochloric acid* yields no precipitate with *solution of platinic chloride* (absence of many foreign alkaloids).

0·2 gramme leaves, on incineration, not more than 0·0002 gramme of residue.

DOSES

Metric.	**Imperial.**
0·12 to 0·5 gramme.	**2 to 8 grains.**

PEPSINUM

[Pepsin.]

Pepsin

Pepsin is a substance containing a proteolytic enzyme of the gastric juice of animals. It may be obtained from the mucous membrane of the stomach of certain animals commonly employed for food. It dissolves not less than 2500 times its weight of coagulated egg albumen.

Characters. A colourless, or light buff-coloured, amorphous powder, or translucent scales; odour, faintly meaty; taste, slightly acid or saline.

Soluble in *water*, yielding an opalescent solution; insoluble in *alcohol* (*90 per cent.*), and in *ether*.

Tests for Identity. The proteolytic activity of an aqueous solution is destroyed at once by boiling; and is destroyed by warming for ten minutes at 40°, when the *reaction* has been adjusted to *p*H 8·0.

Dissolve 1 gramme in *N/50 hydrochloric acid*; divide the solution into two portions, and boil one to destroy the enzyme;

into each place a few shreds of *carmine fibrin*, and keep in a thermostat at 38° to 40° for one hour; the unboiled liquid is stained red; the boiled liquid remains almost colourless.

Assay. Triturate 0·25 gramme with 1 gramme of *sodium chloride* in a small mortar, until thoroughly mixed; add slowly acidified water, prepared by diluting 0·5 millilitres of *hydrochloric acid* to 1000 millilitres with *water*, continuing the trituration; transfer to a litre flask, wash the mortar with the acidified water, and add the washings to the contents of the flask, until 1000 millilitres is obtained; shake frequently during half an hour, allow to stand overnight, and shake again immediately before use.

Prepare some coagulated egg albumen by boiling fresh eggs in water for fifteen minutes, immersing them in cold water until cool, separating the whites, and at once rubbing these through a hair-sieve, having 12 meshes to a centimetre.

Triturate 12·5 grammes of the freshly prepared coagulated egg albumen in a small mortar with 50 millilitres of the acidified water, until reduced to uniform granules. Transfer to a 250 millilitre flask, rinsing the mortar with a further 50 millilitres of the acidified water, and adding the rinsings to the contents of the flask. Immerse the flask in a water-bath at 40° to 41°, its contents being on a lower level than the water in the bath. When the contents of the flask have reached the temperature of the bath, add 20 millilitres of the pepsin solution, and digest for six hours, shaking at intervals of fifteen minutes; no granules are visible, and the liquid is not more than faintly opalescent.

Pepsin, which dissolves more than 2500 times its weight of coagulated egg albumen, may be diluted by admixture with Lactose.

Storage. Pepsin should be kept in a well-closed container, and stored in a cool place.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

PHENACETINUM

[Phenacet.]

Phenacetin

Synonym. Acetphenetidin.

$CH_3CO{\cdot}NH{\cdot}C_6H_4{\cdot}OC_2H_5$ $[CH_3CO{\cdot}NH : OC_2H_5 = 1:4]$

Mol. Wt. 179·1

Phenacetin is aceto-*p*-phenetidide, and may be obtained by the acetylation of *p*-phenetidine.

Characters. White, glistening, crystalline scales, or a fine white crystalline powder; odourless; taste, slightly bitter.

Soluble in about 1700 parts of *water*, in *alcohol* (*95 per cent.*), in *ether*, and in *chloroform*.

Tests for Identity. Boil 0·1 gramme with 1 millilitre of *hydrochloric acid* for three minutes, dilute with 10 millilitres of *water*, cool, and filter; to the filtrate add one drop of *N/10 potassium dichromate*; a violet colour, changing rapidly to ruby red, is produced.

Tests for Purity. *Melting-point*, 134° to 136°.

Shake 1 gramme with 20 millilitres of *water* for two minutes, and filter; the filtrate is neutral to *litmus*.

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

Boil 0·5 gramme with 10 millilitres of *water* for one minute, cool, filter, and add to the filtrate *solution of bromine*, drop by drop, agitating after each addition until the solution remains permanently yellow; no turbidity, and no precipitate, is produced (absence of acetanilide).

To 0·3 gramme add 1 millilitre of *alcohol* (*90 per cent.*) and one drop of *N/10 iodine*; dilute with 3 millilitres of *water*, and boil; the solution does not acquire a red tint (absence of *p*-phenetidine).

Leaves, on incineration, not more than 0·05 per cent. of residue.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

PHENAZONUM

[Phenazon.]

Phenazone

Synonym. Antipyrin.

$C_{11}H_{12}ON_2$ . . . . Mol. Wt. 188·1

Phenazone is 1-phenyl-2: 3-dimethyl-5-pyrazolone, and may be obtained by the interaction of phenylhydrazine and ethyl acetoacetate, and subsequent methylation.

Characters. Small, colourless crystals, or a white crystalline powder; odourless; taste, slightly bitter.

Soluble in 1·2 parts of *water*, in 1·3 parts of *alcohol* (*90 per cent.*), in about 50 parts of *ether*, and in 1·3 parts of *chloroform*.

Tests for Identity. An aqueous solution gives a white precipitate with *solution of tannic acid.*

Add 12 millilitres of a 1 per cent. w/v aqueous solution to 0·1 gramme of *sodium nitrite*, and then 1 millilitre of *dilute sulphuric acid*; a green colour is produced.

To 2 millilitres of a 0·1 per cent. w/v aqueous solution add 1 drop of *test-solution of ferric chloride*; a deep red colour is produced, which, on the addition of 10 drops of *sulphuric acid*, changes to light yellow.

Tests for Purity. *Melting-point*, 111° to 113°.

A 5 per cent. w/v aqueous solution is neutral to *litmus*.

Leaves, on incineration, not more than 0·1 per cent. of residue.

DOSES

Metric.	Imperial.
0·3 to 0·6 gramme.	**5 to 10 grains.**

PHENOBARBITONUM

[Phenobarbiton.]

Phenobarbitone

Synonym. Phenobarbital.

$(C_2H_5)(C_6H_5)C{\cdot}CO{\cdot}NH{\cdot}CO{\cdot}NH{\cdot}CO$ Mol. Wt. 232·1

Phenobarbitone is 5-phenyl-5-ethylbarbituric acid, and may be obtained by the condensation of ethyl phenylethylmalonate with urea.

Characters. A white, crystalline powder; odourless; taste, slightly bitter.

Soluble in about 1000 parts of *water*, in *alcohol* (*90 per cent.*), in *ether*, in *chloroform*, and in aqueous solutions of alkali hydroxides, and of alkali carbonates.

Tests for Identity. A saturated aqueous solution is acid to *litmus*.

When fused with a caustic alkali, or when boiled with a strong solution of caustic alkali, it gives off ammonia.

Tests for Purity. *Melting-point*, 173° to 177°.

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

Dissolve 0·5 gramme in a slight excess of *solution of sodium hydroxide*, extract with *ether*, and evaporate; the residue weighs not more than 0·0005 gramme (limit of neutral and basic substances).

Boil 1 gramme for three minutes with 5 millilitres of *alcohol* (*90 per cent.*); solution is complete (absence of phenylbarbituric acid).

Leaves, on incineration, not more than 0·05 per cent. of residue.

DOSES

Metric.	Imperial.
0·03 to 0·12 gramme.	$^1/_2$ to 2 grains.

PHENOBARBITONUM SOLUBILE

[Phenobarbiton. Solub.]

Soluble Phenobarbitone

Synonym. Soluble Phenobarbital.

$(C_2H_5)(C_6H_5)\overline{C\cdot CO\cdot NH\cdot CO\cdot NNa\cdot CO}$ Mol. Wt. 254·1

Soluble Phenobarbitone is the monosodium derivative of 5-phenyl-5-ethylbarbituric acid, and may be obtained by the interaction of phenobarbitone and sodium hydroxide. It contains not less than 95 per cent. of $C_{12}H_{11}O_3N_2Na$.

Characters. A white, hygroscopic powder; odourless; taste, bitter.

Very soluble in *water*; soluble in *alcohol* (*90 per cent.*); insoluble in *ether*, and in *chloroform*.

Tests for Identity. A 5 per cent. w/v aqueous solution is alkaline to *litmus*, and yields a precipitate of phenobarbitone on the addition of *dilute hydrochloric acid*.

The residue, left after incineration, gives the *reactions* characteristic of sodium.

Tests for Purity. 1 gramme dissolves without residue in 20 millilitres of *alcohol* (*90 per cent.*) (distinction from soluble barbitone).

Shake 0·5 gramme with 20 millilitres of *ether*, filter, evaporate the filtrate, and dry the residue at 100°; the residue weighs not more than 0·003 gramme (limit of free phenobarbitone, and of neutral and basic substances).

Assay. Dissolve about 0·5 gramme, accurately weighed, in 5 millilitres of *water*, add a slight excess of *dilute sulphuric acid*, and extract the liberated phenobarbitone by shaking with successive portions of *ether*. Remove the ether, and dry the residue at 100°. 1 gramme of the residue is equivalent to 1·0947 gramme of $C_{12}H_{11}O_3N_2Na$.

Storage. Soluble Phenobarbitone should be kept in a well-closed container.

DOSES

Metric.	**Imperial.**
0·03 to 0·12 gramme.	**$^1/_2$ to 2 grains.**

PHENOL

[Phenol.]

Phenol

Synonyms. Acidum Carbolicum : Carbolic Acid.

C_6H_5OH . . . . Mol. Wt. 94·05

Phenol may be obtained from coal tar oil, or may be prepared synthetically. It contains not less than 98 per cent. of C_6H_6O.

Characters. Colourless, needle-shaped, deliquescent crystals, or crystalline masses ; odour, characteristic and not tarry ; taste sweetish and pungent.

Soluble in 13 parts of *water*, in *alcohol* (*90 per cent.*), in *ether*, in *chloroform*, in *glycerin*, and in fixed and volatile oils.

Tests for Identity. *Freezing-point,* about 40° ; *boiling-point,* about 182°.

To 10 millilitres of an aqueous solution add 1 drop of *test-solution of ferric chloride* ; a violet colour is produced.

An aqueous solution gives with *solution of bromine* a white precipitate, which at first redissolves, but becomes permanent, on the addition of an excess of the reagent.

Tests for Purity. A solution of 1 part in 13 parts of *water* at 15·5° is clear, and not more than faintly acid to *litmus.*

Leaves, when volatilised on a water-bath, not more than 0·05 per cent. of residue.

Assay. Dissolve about 1·5 gramme, accurately weighed, in sufficient *water* to produce 1000 millilitres. Transfer 25 millilitres of this solution to a 500 millilitre glass-stoppered vessel; add 30 millilitres of *N/10 bromine* and 5 millilitres of *hydrochloric acid,* shake repeatedly during half an hour, and set aside for fifteen minutes. Add 5 millilitres of a 20 per cent. w/v aqueous solution of *potassium iodide,* shake thoroughly, wash the stopper, and titrate with *N/10 sodium thiosulphate.* Each millilitre of *N/10 bromine* is equivalent to 0·001568 gramme of C_6H_6O.

Storage. Phenol should be kept in a well-closed container, protected from light, and stored in a cool place.

Preparations. Glycerinum Phenolis.
Phenol Liquefactum.
Trochiscus Phenolis.
Suppositorium Phenolis.
Unguentum Phenolis.

DOSES

Metric.	Imperial.
0·06 to 0·2 gramme.	1 to 3 grains.

PHENOL LIQUEFACTUM

[Phenol Liq.]

Liquefied Phenol

Synonym. Acidum Carbolicum Liquefactum.

Liquefied Phenol contains 80 per cent. w/w of Phenol (limits, 78·5 to 81·5).

Phenol	800 grammes
Distilled Water, sufficient to produce	1000 grammes

Mix.

Characters. A colourless liquid, which may acquire a pinkish hue on keeping; odour, characteristic and somewhat aromatic. Caustic.

Forms a clear solution on the addition of 15 parts of water at 15·5°.

Specific gravity (15·5°/15·5°), about 1·063; *boiling-point*, gradually rising to a temperature not higher than 183°.

Miscible with *alcohol* (*90 per cent.*), with *ether*, and with *glycerin*.

Assay. Carry out the Assay as directed under 'Phenol'. Each millilitre of *N/10 bromine* is equivalent to 0·001568 gramme of C_6H_6O.

Storage. Liquefied Phenol should be kept in a well-closed container, protected from light.

Preparation. Trochiscus Phenolis.

NOTE.—When Phenol is to be mixed with collodion, fixed oils or paraffins, melted Phenol should be used, and not Liquefied Phenol.

DOSES

Metric.	Imperial.
0·06 to 0·2 mil.	1 to 3 minims.

PHENOLPHTHALEINUM

[Phenolphthal.]

Phenolphthalein

$(C_6H_4{\cdot}OH)_2\overline{C{\cdot}C_6H_4{\cdot}CO{\cdot}O}$ . . Mol. Wt. 318·1

Phenolphthalein may be prepared by heating phenol with phthalic anhydride and sulphuric acid, and purifying the product.

Characters. A white, or yellowish-white, crystalline or amorphous, powder; odourless and tasteless.

Almost insoluble in *water*; soluble in *alcohol* (*95 per cent.*), and in *ether*.

Tests for Identity. Soluble in dilute solutions of alkali hydroxides, and in hot solutions of alkali carbonates, forming a red solution, which is decolourised by dilute acids.

Tests for Purity. *Melting-point*, 254° to 258°.

0·5 gramme dissolves completely in 4 millilitres of *N/1 sodium hydroxide* and 50 millilitres of *water* (limit of fluorane).

Moisten 2 grammes with *sulphuric acid*, ignite, again moisten with *sulphuric acid*, and reignite; the residue weighs not more than 0·001 gramme.

Arsenic limit, 2 parts per million.

DOSES

Metric.	Imperial.
0·06 to 0·3 gramme.	**1 to 5 grains.**

PHYSOSTIGMINÆ SALICYLAS

[Physostig. Salicyl.]

Physostigmine Salicylate

Synonym. Eserine Salicylate.

$C_{15}H_{21}O_2N_3, C_7H_6O_3$ . . Mol. Wt. 413·2

Physostigmine Salicylate is the salicylate of an alkaloid, physostigmine, obtained from the seed of *Physostigma venenosum* Balfour.

Characters. Colourless, or faintly yellow, crystals, which gradually acquire a red tint on exposure to air and light.

Soluble in about 100 parts of *water*; more soluble in *alcohol* (*90 per cent.*).

A 1 per cent. w/v aqueous solution is neutral to *methyl red*.

Tests for Identity. *Melting-point* when dried at 100°, 185° to 187°.

A 1 per cent. w/v aqueous solution yields with a dilute aqueous solution of *sodium hydroxide* a white precipitate, which turns pink; the precipitate dissolves in an excess of the reagent, producing a red solution.

Warm a few milligrams with several drops of *dilute solution of ammonia*; a yellowish-red solution is produced; evaporate this solution; a bluish residue remains, which responds to the following tests:—

> The residue is soluble in *alcohol* (*95 per cent.*), forming a blue solution which, on the addition of *acetic acid*, appears blue by transmitted light, and shows a red fluorescence, which is intensified by dilution with water.
>
> The residue is soluble in *sulphuric acid* forming a green solution which, on the gradual addition of *alcohol* (*95 per cent.*), changes to red, but reverts to green when the alcohol is evaporated.

An aqueous solution yields with *test-solution of ferric chloride* a violet colour.

Tests for Purity. Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

0·2 gramme loses, when dried at 100°, not more than 0·002 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Physostigmine Salicylate should be kept in a well-closed container, protected from light.

A solution of Physostigmine Salicylate becomes red on exposure to air, and preferably should be freshly prepared; if stored, it should be kept in a sealed container.

Sterilisation of a Solution. A solution of Physostigmine Salicylate for injection is sterilised by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass*.

Preparations. Lamella Physostigminæ.
Oculentum Physostigminæ.

DOSES

Metric.	**Imperial.**
0·0006 to 0·0012 gramme.	**$^1/_{100}$ to $^1/_{50}$ grain.**

PILOCARPINÆ NITRAS

[Pilocarp. Nit.]

Pilocarpine Nitrate

$C_{11}H_{16}O_2N_2,HNO_3$ . . Mol. Wt. 271·2

Pilocarpine Nitrate is the nitrate of an alkaloid, pilocarpine, obtained from the leaves of *Pilocarpus microphyllus* Stapf, and other species of *Pilocarpus*.

Characters. Colourless crystals, or a white crystalline powder. Soluble in about 8 parts of *water*.

A 5 per cent. w/v aqueous solution is slightly acid to *litmus*, and neutral to *methyl red*.

Tests for Identity. To a solution of 0·01 gramme in 5 millilitres of *water* add 2 drops of *dilute sulphuric acid*, 1 millilitre of *solution of hydrogen peroxide*, 1 millilitre of *benzene*, and 1 drop of *solution of potassium chromate*; shake well; the benzene is coloured bluish-violet, and the aqueous layer remains yellow (distinction from other alkaloids).

Yields the *reactions* characteristic of nitrates.

Tests for Purity. *Melting-point*, 174° to 178°; *specific rotation* in 10 per cent. w/v aqueous solution, + 77° to + 83°.

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

To a 1 per cent. w/v aqueous solution add *dilute solution of ammonia*; no turbidity is produced (absence of certain other alkaloids).

To a 1 per cent. w/v aqueous solution add *solution of potassium dichromate*; no turbidity is produced (absence of certain other alkaloids).

0·2 gramme leaves, on incineration, not more than 0·0002 gramme of residue.

Sterilisation of a Solution. A solution of Pilocarpine Nitrate for injection is sterilised by *heating in an autoclave*, or by *Tyndallisation*, or by *filtration*.

DOSES

Metric.	Imperial.
0·003 to 0·012 gramme.	$^{1}/_{20}$ to $^{1}/_{5}$ grain.

PILULA ALOES

[Pil. Aloes]

Pill of Aloes

Synonym. Aloes Pill.

Aloes, in *fine powder* . .	58 grammes
Hard Soap, in *fine powder* .	29 grammes
Oil of Caraway . . .	3 millilitres
Syrup of Liquid Glucose . .	10 grammes or a sufficient quantity

Mix to form a mass of suitable consistence.

DOSES

Metric.	Imperial.
0·25 to 0·5 gramme.	4 to 8 grains.

PILULA ALOES ET ASAFŒTIDÆ

[Pil. Aloes et Asafœt.]

Pill of Aloes and Asafetida

Aloes, in *fine powder*	30 grammes
Asafetida	30 grammes
Hard Soap, in *fine powder*	30 grammes
Syrup of Liquid Glucose	10 grammes or a sufficient quantity

Mix to form a mass of suitable consistence.

DOSES

Metric.	Imperial.
0·25 to 0·5 gramme.	4 to 8 grains.

PILULA ALOES ET FERRI

[Pil. Aloes et Ferr.]

Pill of Aloes and Iron

Exsiccated Ferrous Sulphate	10 grammes
Aloes, in *fine powder*	20 grammes
Cinnamon, in *fine powder*	12 grammes
Cardamom, in *fine powder*	12 grammes
Ginger, in *fine powder*	12 grammes
Syrup of Liquid Glucose	34 grammes or a sufficient quantity

Mix to form a mass of suitable consistence.

DOSES

Metric.	Imperial.
0·25 to 0·5 gramme.	4 to 8 grains.

Pill of Aloes and Iron contains in 0·5 gramme about 0·05 gramme of Exsiccated Ferrous Sulphate, corresponding to about 0·015 gramme of iron, and in 8 grains about $^{4}/_{5}$ grain of Exsiccated Ferrous Sulphate, corresponding to about $^{1}/_{4}$ grain of iron.

PILULA COLOCYNTHIDIS ET HYOSCYA

[Pil. Colocynth. et Hyoscy.]

Pill of Colocynth and Hyoscyamus

Colocynth, in *fine powder* . .	12·5	grammes
Aloes, in *fine powder*. . .	25	grammes
Scammony Resin, in *fine powder*	25	grammes
Curd Soap, in *fine powder* .	7	grammes
Oil of Clove	4	millilitres
Dry Extract of Hyoscyamus .	12·5	grammes
Syrup of Liquid Glucose . .	14	grammes
	or a sufficient quantity	

Mix the Oil of Clove with the Curd Soap, add the remaining ingredients, and mix to form a mass of suitable consistence.

DOSES

Metric.	Imperial.
0·25 to 0·5 gramme.	4 to 8 grains.

PILULA FERRI CARBONATIS

[Pil. Ferr. Carb.]

Pill of Iron Carbonate

Synonyms. Blaud's Pill : Pilula Ferri : Iron Pill.

Pill of Iron Carbonate contains not less than 20 per cent. of ferrous iron, calculated as $FeCO_3$.

Exsiccated Ferrous Sulphate .	34	grammes
Exsiccated Sodium Carbonate .	21·6	grammes
Tragacanth, finely powdered .	2	grammes
Acacia, finely powdered . .	8·4	grammes
Liquid Glucose	32	grammes
Distilled Water	2	millilitres

Mix the Liquid Glucose, Distilled Water and Exsiccated Ferrous Sulphate; add the Exsiccated Sodium Carbonate; mix, and set aside for ten minutes, or until the reaction is complete; add the Tragacanth and Acacia, and mix to form a mass.

Assay. Digest about 2 grammes, accurately weighed, with 5 millilitres of *phosphoric acid* and 20 millilitres of *water*, until the mass is disintegrated; add 20 millilitres of a 25 per cent. w/v aqueous solution of *sulphuric acid*, and titrate with *N/10 potassium dichromate*, using *solution of diphenylamine* as indicator. Each millilitre of *N/10 potassium dichromate* is equivalent to 0·01158 gramme of $FeCO_3$.

DOSES

Metric.	**Imperial.**
0·3 to 2 grammes.	**5 to 30 grains.**

Pill of Iron Carbonate contains in 2 grammes about 0·2 gramme, and in 30 grains about 3 grains, of iron.

PILULA HYDRARGYRI

[Pil. Hydrarg.]

Pill of Mercury

Synonyms. Mercury Pill: Blue Pill.

Pill of Mercury contains 33 per cent. of Mercury (limits, 32 to 34).

Mercury	33 grammes
Syrup	14 grammes
Liquid Glucose	15 grammes
Glycerin	5 grammes
Liquorice, in *fine powder*	33 grammes

Mix the Syrup, Liquid Glucose, Glycerin, and 15 grammes of the Liquorice in a mortar; add the Mercury, and continue the mixing, until metallic globules cease to be visible when examined under a lens magnifying four diameters; add the remainder of the Liquorice; mix thoroughly.

Assay. Boil gently for five minutes about 1 gramme, accurately weighed, with 10 millilitres of *nitric acid* and 25 millilitres of *water*; cool, and dilute with 25 millilitres of *water*. Filter, and wash well with hot *water*. To the warm mixture of filtrate and washings add sufficient *solution of potassium permanganate* to produce a permanent pink colour. Decolourise by the addition of a trace of *ferrous sulphate*, and titrate with *N/10 ammonium thiocyanate*, using *solution of ferric ammonium* *sulphate* as indicator. Each millilitre of *N/10 ammonium thiocyanate* is equivalent to 0·01003 gramme of Hg.

DOSES

Metric.	Imperial.
0·25 to 0·5 gramme.	4 to 8 grains.

PILULA RHEI COMPOSITA

[Pil. Rhei Co.]

Compound Pill of Rhubarb

Synonym. Compound Rhubarb Pill.

Rhubarb, in *fine powder* . .	25 grammes
Aloes, in *fine powder* . .	20 grammes
Myrrh	14 grammes
Hard Soap, in *fine powder* .	14 grammes
Oil of Peppermint . . .	2 millilitres
Syrup of Liquid Glucose . .	25 grammes or a sufficient quantity

Mix to form a mass of suitable consistence.

DOSES

Metric.	Imperial.
0·25 to 0·5 gramme.	4 to 8 grains.

PIX CARBONIS PRÆPARATA

[Pix Carb. Præp.]

Prepared Coal Tar

Prepared Coal Tar is obtained by heating commercial coal tar at a temperature of 50° in a shallow vessel for one hour, stirring frequently.

Characters. A nearly black, viscous liquid, brown in very thin layers; odour, strongly empyreumatic.

Almost insoluble in *water*, to which, however, it communicates its characteristic odour; partially soluble in *alcohol* (*90 per cent.*) and in *ether*; almost entirely soluble in *chloroform*, and in *benzene*.

Preparation.—Liquor Picis Carbonis.

PIX LIQUIDA

[Pix Liq.]

Tar

Tar is a bituminous liquid, obtained from the wood of various trees of the Family Pinaceæ by destructive distillation, and is known in commerce as Stockholm tar.

Characters. Dark brown or nearly black, semi-liquid; heavier than water; odour and taste, characteristic and empyreumatic.

Soluble in *alcohol* (*90 per cent.*), in *ether*, in *chloroform*, and in fixed and volatile oils.

Tests for Identity. Shake 1 gramme for five minutes with 20 millilitres of *water*:—

The aqueous liquid is acid to *litmus*.

To 5 millilitres of the aqueous liquid, filtered, if necessary, with the aid of *kieselguhr*, add 3 drops of a 0·1 per cent. w/v aqueous solution of *ferric chloride*; a red colour is produced.

DOSES

Metric.	**Imperial.**
0·12 to 0·6 gramme.	**2 to 10 grains.**

PLUMBI ACETAS

[Plumb. Acet.]

Lead Acetate

Synonym. Sugar of Lead.

$(CH_3{\cdot}COO)_2Pb,3H_2O$ . . . Mol. Wt. 379·3

Lead Acetate may be obtained by the interaction of lead oxide and acetic acid. It contains not less than 99·5 per cent., and not more than the equivalent of 104·5 per cent., of $C_4H_6O_4Pb,3H_2O$.

Characters. Small, white, transparent, monoclinic prisms, or heavy crystalline masses; odour, acetous; taste, sweet and astringent. Effloresces in warm air. Becomes basic, when heated.

Soluble in 2·5 parts of *water*, and in 30 parts of *alcohol* (*90 per cent.*); freely soluble in *glycerin*.

Tests for Identity. Yields the *reactions* characteristic of lead, and of acetates.

Tests for Purity. 1 gramme, dissolved in 10 millilitres of recently boiled and cooled *water*, yields a solution which is, at most,

PODOPHYLLUM

[Podoph.]

Podophyllum

Synonyms. Podophylli Rhizoma : Podophyllum Rhizome.

Podophyllum consists of the dried rhizome and roots of *Podophyllum peltatum* Linn. It contains not more than 2 per cent. of other organic matter.

Characters. Rhizome, sub-cylindrical, often somewhat flattened dorsiventrally, of very variable length, usually about 5 millimetres thick; externally, reddish-brown, smooth or slightly wrinkled longitudinally; enlarged at intervals of about 5 to 10 centimetres, sometimes with two or three branches at these points; each enlargement about 1 to 2 centimetres long and 1·5 centimetres thick, marked on the upper surface by a depressed circular scar, surrounded by numerous circular leaf scars, some of which bear buds in their axils; on the under surface up to about twelve roots or root scars; the roots, about 1·5 millimetres thick, cylindrical, brown and brittle; fracture, short, the smoothed transverse surface nearly white and starchy, or pale yellowish-brown and horny, and showing a circle of about 20 to 30 small vascular bundles about halfway between the centre and the periphery. Epidermis of the cylindrical portion, composed of subrectangular cells about 4 to 8 times as long as wide, and of the enlarged portion, composed of more nearly isodiametric cells, all containing red-brown contents; calcium oxalate in cluster crystals often exceeding 60 microns in diameter; sclerenchymatous cells mostly cylindrical. Odour, slight and characteristic; taste, somewhat bitter and acrid.

Test for Identity. Macerate 0·5 gramme for ten minutes in 10 millilitres of *alcohol (90 per cent.)*, and filter; to the filtrate add a few drops of *strong solution of copper acetate*; a bright green colour, but no brown precipitate, is produced.

DOSES

Metric.	Imperial.
0·12 to 0·6 gramme.	2 to 10 grains.

PODOPHYLLUM INDICUM

[Podoph. Ind.]

Indian Podophyllum

Synonyms. Podophylli Indici Rhizoma : Indian Podophyllum Rhizome.

Indian Podophyllum consists of the dried rhizome and roots of *Podophyllum emodi* Wall. It contains not more than 2 per cent. of other organic matter.

Characters. Rhizome, irregular and tortuous, in knotty pieces about 2 to 4 centimetres long and 1 to 2 centimetres thick, somewhat flattened dorsiventrally; on the upper surface about 3 or 4 cup-shaped scars, the under surface with numerous root scars or stout roots; externally, yellowish-brown to earthy-brown; fracture, short, exhibiting a pale brown and starchy or horny transverse surface, with a circle of radially elongated vascular bundles and a large central pith; roots, mostly detached and usually forming the major part of the drug. Epidermal cells absent; cork of thin-walled isodiametric cells; calcium oxalate crystals, few and not exceeding 60 microns in diameter; abundant short and contorted sclerenchymatous cells. Odour, slight and characteristic; taste, somewhat bitter and acrid.

Test for Identity. Macerate 0·5 gramme for ten minutes in 10 millilitres of *alcohol* (*90 per cent.*), and filter; to the filtrate add a few drops of *strong solution of copper acetate*; a brown precipitate, but no green colour, is produced.

DOSES

Metric.	Imperial.
0·12 to 0·6 gramme.	2 to 10 grains.

POTASSA SULPHURATA

[Potass. Sulphur.]

Sulphurated Potash

Sulphurated Potash is a mixture of salts of potassium, chiefly sulphides. It contains 43·5 per cent. of total sulphur (limits, 42 to 45).

Potassium Carbonate . .	1000 grammes
Sublimed Sulphur . . .	500 grammes

Mix the Potassium Carbonate, previously dried, with the Sulphur; heat in a covered crucible, at first gently, afterwards to dull redness, until effervescence ceases and the mass fuses; pour it on to a stone slab. and, after it has solidified, break it into fragments.

Characters. Solid fragments, externally greenish-yellow, internally pale liver-brown, rapidly changing to greenish-yellow on exposure to air; odour, that of hydrogen sulphide; taste, alkaline and acrid.

Readily soluble in *water*.

Tests for Identity and Purity. An aqueous solution is yellow and opalescent, and, on standing, deposits only a trace of insoluble matter.

To an aqueous solution add an excess of *hydrochloric acid*; hydrogen sulphide is given off, and sulphur is precipitated; boil, and filter; to the filtrate add *solution of platinic chloride*; a yellow precipitate is produced.

Assay. Dissolve about 0·2 gramme, accurately weighed, in 10 millilitres of *water* in a small flask, add 5 millilitres of *solution of sodium hydroxide*, heat the liquid to the boiling-point, and add slowly, the flask being constantly rotated, *solution of bromine As T.*, until a clear solution is obtained and bromine is present in excess. Acidify with *hydrochloric acid*, boil until the excess of bromine is driven off, dilute with *water* to about 100 millilitres, add slowly a slight excess of hot *solution of barium chloride*, and heat for half an hour on a water-bath; collect the precipitate, wash, dry, and ignite it, and weigh the residue. Each gramme of the residue is equivalent to 0·1373 gramme of sulphur.

Storage. Sulphurated Potash should be kept in a well-closed container.

POTASSII ACETAS

[Pot. Acet.]

Potassium Acetate

$CH_3{\cdot}COOK$ . . . . Mol. Wt. 98·12

Potassium Acetate may be obtained by fusing the product of the interaction of acetic acid and potassium carbonate. It contains not less than 99 per cent. of $C_2H_3O_2K$, calculated with reference to the substance dried at 100°.

Characters. A white powder or granules, or white foliaceous satiny masses; odourless, or having a faint acetous odour; taste, sharp and saline. Very deliquescent.

Soluble in about 0·5 parts of *water*, and in about 2 parts of *alcohol (90 per cent.)*.

Tests for Identity. Yields the *reactions* characteristic of potassium, and of acetates.

Tests for Purity. 1 gramme, dissolved in 20 millilitres of recently boiled and cooled *water*, requires not more than 0·5 millilitre of *N/10 sulphuric acid* to produce a solution which is acid to *phenolphthalein* (limit of alkalinity).

Dissolve 0·5 gramme in 25 millilitres of *water*, and warm with 1 millilitre of *dilute solution of ammonia* and 1 millilitre of *solution of ammonium oxalate*; no precipitate or turbidity is produced (limit of aluminium, and of calcium).

0·5 gramme complies with the *limit test for chlorides*, and with the *limit test for sulphates.*

Arsenic limit, 2 parts per million. *Lead limit*, 10 parts per million.

Loses, when dried at 100°, not more than 5 per cent. of its weight.

Assay. Heat, until carbonised, about 2 grammes, accurately weighed, cool, and boil the residue with 50 millilitres of *water* and 50 millilitres of *N/2 sulphuric acid*; filter, and wash the filter with *water*; titrate the excess of acid in the filtrate and washings with *N/2 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/2 sulphuric acid* is equivalent to 0·04906 gramme of $C_2H_3O_2K$.

Storage. Potassium Acetate should be kept in a well-closed, glass-stoppered container.

DOSES

Metric.	Imperial.
1 to 4 grammes.	15 to 60 grains.

POTASSII BICARBONAS

[Pot. Bicarb.]

Potassium Bicarbonate

$KHCO_3$ . . . . . Mol. Wt. 100·1

Potassium Bicarbonate may be obtained by saturating a strong aqueous solution of potassium carbonate with carbon dioxide. It contains not less than 99 per cent., and not more than the equivalent of 100·5 per cent., of $KHCO_3$.

Characters. Colourless, transparent, monoclinic prisms, or a white granular powder; odourless; taste, saline and feebly alkaline.

Soluble in 4 parts of *water*; almost insoluble in *alcohol (90 per cent.)*.

Tests for Identity. Yields the *reactions* characteristic of potassium, and of bicarbonates.

Tests for Purity. Boil 5 grammes with 50 millilitres of *water* and 10 millilitres of *dilute solution of ammonia*, filter, and wash; the insoluble residue, after ignition, weighs not more than 0·005 gramme (limit of aluminium, calcium and insoluble matter).

The reaction of a 1 per cent. w/v solution in *water* is not greater than *p*H 8·6, *solution of thymol blue* being used as indicator.

0·5 gramme, dissolved in *water* with the addition of 1·5 millilitres of *nitric acid*, complies with the *limit test for chlorides*.

1 gramme, dissolved in *water* with the addition of 2 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates*.

2 grammes complies with the *limit test for iron*.

Arsenic limit, 2 parts per million. *Lead limit*, 5 parts per million.

Assay. Dissolve about 1·5 grammes, accurately weighed, in 20 millilitres of *water*, and titrate with *N/2 sulphuric acid*, using *solution of methyl orange* as indicator. Each millilitre of *N/2 sulphuric acid* is equivalent to 0·05005 gramme of $KHCO_3$.

DOSES

Metric.	Imperial.
1 to 4 grammes.	15 to 60 grains.

POTASSII BROMIDUM

[Pot. Brom.]

Potassium Bromide

KBr . . . . . Mol. Wt. 119·0

Potassium Bromide may be obtained by the interaction of ferrous bromide and potassium carbonate. It contains not less than 99 per cent. of KBr, calculated with reference to the substance dried at 110°.

Characters. Colourless, transparent or opaque, crystals, or a white granular powder; odourless; taste, saline.

Soluble in about 2 parts of *water*, and in about 200 parts of *alcohol (90 per cent.)*.

Tests for Identity. Yields the *reactions* characteristic of potassium, and of bromides.

Tests for Purity. Dissolve 1 gramme in 10 millilitres of freshly boiled *water*, and add 0·2 millilitre of *N/50 sulphuric acid*; no colour is produced on the addition of a drop of *solution of phenolphthalein* (limit of alkali).

Add 1 millilitre of *dilute sulphuric acid* to 1 gramme of the powdered salt; no yellow colour is produced immediately (limit of bromate).

Dissolve 0·5 gramme in 10 millilitres of *water*, and add 1 millilitre of *dilute sulphuric acid*; no turbidity is produced within five minutes (limit of barium).

Dissolve 1 gramme in 75 millilitres of *water* and 25 millilitres of *nitric acid*; expel the bromine by boiling for one minute, a rapid current of air being passed through the mixture while boiling and for twenty minutes during cooling; the residual liquid requires for complete precipitation not more than 1·3 millilitres of *N/10 silver nitrate* (limit of chlorides).

2 grammes complies with the *limit test for sulphates.*

0·5 gramme complies with the *limit test for iron.*

Arsenic limit, 2 parts per million. *Lead limit*, 10 parts per million.

Loses, when dried at 110°, not more than 1 per cent. of its weight.

Assay. Dissolve about 0·4 gramme, accurately weighed, in 40 millilitres of *water* and 5 millilitres of *nitric acid*. Add 50 millilitres of *N/10 silver nitrate*; titrate with *N/10 ammonium thiocyanate*, using *solution of ferric ammonium sulphate* as indicator, and correct for the amount of chloride present, as determined by the test for limit of chlorides. Each millilitre of *N/10 silver nitrate* is equivalent to 0·0119 gramme of KBr.

DOSES

Metric.	Imperial.
0·3 to 2 grammes.	5 to 30 grains.

POTASSII CARBONAS

[Pot. Carb.]

Potassium Carbonate

K_2CO_3 . . . . . . Mol. Wt. 138·2

Potassium Carbonate may be obtained by the interaction of potassium sulphate and calcium carbonate. It contains not less than 99 per cent. of K_2CO_3, calculated with reference to the substance dried between 200° and 300°.

Characters. A white, crystalline, powder; odourless; taste, strongly alkaline. Very deliquescent.

Soluble in 1 part of *water*; insoluble in *alcohol (90 per cent.)*.

Tests for Identity. Yields the *reactions* characteristic of potassium, and of carbonates.

Tests for Purity. Boil 5 grammes with 50 millilitres of *water* and 10 millilitres of *dilute solution of ammonia*, filter, and wash; the insoluble residue, after ignition, weighs not more than 0·005 gramme (limit of aluminium, calcium and insoluble matter).

0·5 gramme, dissolved in *water* with the addition of 2 millilitres of *nitric acid*, complies with the *limit test for chlorides*.

1 gramme, dissolved in *water* with the addition of 2 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates*.

0·5 gramme complies with the *limit test for iron*.

Arsenic limit, 2 parts per million. *Lead limit*, 5 parts per million.

Loses, when dried between 200° and 300°, not less than 14 per cent., and not more than 18 per cent., of its weight.

Assay. Dissolve about 1 gramme, accurately weighed, in 20 millilitres of *water*, and titrate with *N/2 sulphuric acid*, using *solution of methyl orange* as indicator. Each millilitre of *N/2 sulphuric acid* is equivalent to 0·03455 gramme of K_2CO_3.

DOSES

Metric.	**Imperial.**
0·12 to 0·3 gramme.	**2 to 5 grains.**

POTASSII CHLORAS

[Pot. Chloras]

Potassium Chlorate

$KClO_3$ . . . . . Mol. Wt. 122·6

Potassium Chlorate may be obtained by the electrolysis of a hot solution of potassium chloride. It contains not less than 99 per cent. of $KClO_3$.

Characters. A white powder, or colourless crystals; taste, cool and saline. In admixture with organic or readily oxidisable substances, it is liable to explode, if heated or subjected to concussion or trituration.

Soluble in 16 parts of *water*; almost insoluble in *alcohol (90 per cent.)*; soluble in 30 parts of *glycerin*.

Tests for Identity. About 0·2 gramme, added to 1 millilitre of *hydrochloric acid*, produces a yellow liquid, and chlorine and oxides of chlorine are given off.

When heated alone, it melts and evolves oxygen, and leaves a residue which yields the *reactions* characteristic of potassium, and of chlorides.

Tests for Purity. 0·5 gramme complies with the *limit test for chlorides.*

1 gramme complies with the *limit test for sulphates.*

Arsenic limit, 2 parts per million. *Lead limit,* 10 parts per million.

Assay. Dissolve about 0·8 gramme, accurately weighed, in sufficient *water* to produce 100 millilitres; heat 10 millilitres of the solution at about 50° for twenty minutes in a stoppered bottle with 25 millilitres of *acid solution of ferrous sulphate* and 5 grammes of *potassium iodide*; cool, add 50 millilitres of *water,* and titrate the liberated iodine with *N/10 sodium thiosulphate.* Repeat the operation without the potassium chlorate. The difference between the two titrations represents the *N/10 sodium thiosulphate* required to react with the iodine liberated. Each millilitre of *N/10 sodium thiosulphate* is equivalent to 0·002043 gramme of $KClO_3$.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

POTASSII CITRAS

[Pot. Cit.]

Potassium Citrate

$COOK{\cdot}C(OH)(CH_2{\cdot}COOK)_2,H_2O$. Mol. Wt. 324·4

Potassium Citrate may be obtained by the interaction of citric acid and potassium carbonate. It contains not less than 99 per cent. of $C_6H_5O_7K_3,H_2O$.

Characters. White, granular crystals, or a crystalline powder; odourless; taste, saline. Slightly deliquescent in moist air.

Soluble in 1 part of *water*; almost insoluble in *alcohol (90 per cent.)*; readily soluble in *glycerin.*

Tests for Identity. Yields the *reactions* characteristic of potassium, and of citrates.

Tests for Purity. 2 grammes, boiled with 25 millilitres of *water,* requires for neutralisation not more than 0·5 millilitre of either *N/10 sulphuric acid* or *N/10 sodium hydroxide,* using *solution of phenolphthalein* as indicator (limit of alkalinity, or of acidity).

Heat 2 grammes in a boiling water-bath for one hour with 10 millilitres of *sulphuric acid*; not more than a pale yellow colour is produced (limit of tartrates).

Dissolve 2 grammes in 20 millilitres of *water,* add 0·5 millilitre of *acetic acid* and 1 millilitre of *solution of calcium chloride,* and set aside for twenty-four hours; the solution remains clear (limit of oxalates).

1 gramme, dissolved in *water* with the addition of 2 millilitres of *nitric acid*, complies with the *limit test for chlorides.*

1 gramme, dissolved in *water* with the addition of 2 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates.*

Arsenic limit, 2 parts per million. *Lead limit*, 10 parts per million.

Assay. Heat, until carbonised, about 2 grammes, accurately weighed, cool, and boil the residue with 50 millilitres of *water* and 50 millilitres of *N/2 sulphuric acid*; filter, and wash the filter with *water*; titrate the excess of acid in the filtrate and washings with *N/2 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/2 sulphuric acid* is equivalent to 0·0541 gramme of $C_6H_5O_7K_3,H_2O$.

Storage. Potassium Citrate should be kept in a well-closed container.

DOSES

Metric.	Imperial.
1 to 4 grammes.	15 to 60 grains.

POTASSII HYDROXIDUM

[Pot. Hydrox.]

Potassium Hydroxide

Synonyms. Potassa Caustica : Caustic Potash.

KOH . . . . . Mol. Wt. 56·11

Potassium Hydroxide may be obtained by the electrolysis of an aqueous solution of potassium chloride. It contains not less than 85 per cent. of total alkali, calculated as KOH.

Characters. Dry, white sticks or fused masses, hard, brittle, and showing a crystalline fracture. Very deliquescent. Strongly alkaline and corrosive. Rapidly absorbs carbon dioxide.

Soluble in 0·95 part of *water*, and in 3 parts of *alcohol (90 per cent.)*; very soluble in boiling *dehydrated alcohol.*

Tests for Identity. Yields the *reactions* characteristic of potassium.

Tests for Purity. Dissolve 5 grammes in 100 millilitres of *alcohol (90 per cent.)*, previously neutralised to *phenolphthalein*, filter, and wash with neutralised *alcohol (90 per cent.)*; the undissolved residue does not require more than 14 millilitres of *N/5 sulphuric acid* for neutralisation, using *solution of methyl orange* as indicator (limit of carbonate).

Boil 5 grammes with 40 millilitres of *dilute hydrochloric acid*, cool, make alkaline with *dilute solution of ammonia*, filter, and wash; the insoluble residue, after ignition, weighs not more than 0·005 gramme (limit of aluminium, iron and matter insoluble in hydrochloric acid).

0·5 gramme, dissolved in *water* with the addition of 1·6 millilitres of *nitric acid*, complies with the *limit test for chlorides.*

1 gramme, dissolved in *water* with the addition of 2 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates.*

Arsenic limit, 5 parts per million. *Lead limit*, 5 parts per million.

Assay. Dissolve about 1 gramme, accurately weighed, in 25 millilitres of *water*, and titrate with *N/1 sulphuric acid*, using *solution of methyl orange* as indicator. Each millilitre of *N/1 sulphuric acid* is equivalent to 0·05611 gramme of total alkali, calculated as KOH.

Storage. Potassium Hydroxide should be kept in a well-closed container.

POTASSII IODIDUM

[Pot. Iod.]

Potassium Iodide

KI . . . . . . Mol. Wt. 166·0

Potassium Iodide may be obtained by the action of excess of iodine on a solution of potassium hydroxide, evaporating to dryness, fusing with charcoal, and purifying by crystallisation from water. It contains not less than 99 per cent. of KI, calculated with reference to the substance dried at 110°.

Characters. Colourless, transparent or somewhat opaque, crystals, or a white granular powder; odourless; taste, saline and slightly bitter.

Soluble in 0·7 part of *water*, in 12 parts of *alcohol (90 per cent.)*, and in 2 parts of *glycerin.*

Tests for Identity. Yields the *reactions* characteristic of potassium, and of iodides.

Tests for Purity. Dissolve 1 gramme in 10 millilitres of freshly boiled and cooled *water*, and add 0·2 millilitre of *N/50 sulphuric acid*; no colour is produced on the addition of a drop of *solution of phenolphthalein* (limit of alkali).

Dissolve 0·5 gramme in 10 millilitres of freshly boiled and cooled *water*, and add 2 drops of *dilute sulphuric acid*, followed by a drop of *mucilage of starch*; no blue colour is produced immediately (limit of iodate).

Dissolve 0·5 gramme in 10 millilitres of *water*, and add 1 millilitre of *dilute sulphuric acid*; no turbidity is produced within five minutes (limit of barium).

Dissolve 0·5 gramme in 5 millilitres of warm *water*, add 1 drop of *solution of ferrous sulphate* and 0·5 millilitre of *solution of sodium hydroxide*, and acidify with *hydrochloric acid*; no blue colour is produced (limit of cyanide).

2 grammes complies with the *limit test for sulphates.*

Arsenic limit, 2 parts per million. *Lead limit,* 10 parts per million.

Loses, when dried at 110°, not more than 1 per cent. of its weight.

Assay. Dissolve about 0·7 gramme, accurately weighed, in 10 millilitres of *water*; add 40 millilitres of *hydrochloric acid*, and, shaking vigorously, titrate with *M/20 potassium iodate*, until the dark brown solution which is formed becomes only light brown in colour; add 5 millilitres of *chloroform*, and continue the titration until the chloroform becomes colourless, and the supernatant liquid is clear yellow. Each millilitre of *M/20 potassium iodate* is equivalent to 0·0166 gramme of KI.

DOSES

Metric.	Imperial.
0·3 to 2 grammes.	5 to 30 grains.

POTASSII NITRAS

[Pot. Nitras]

Potassium Nitrate

KNO_3 . . . . . . Mol. Wt. 101·1

Potassium Nitrate may be obtained by the interaction of sodium nitrate and potassium chloride. It contains not less than 99 per cent. of KNO_3.

Characters. A white, crystalline powder, or colourless crystals; odourless; taste, cool and saline.

Soluble in 4 parts of *water.*

Tests for Identity. Yields the *reactions* characteristic of potassium, and of nitrates.

Tests for Purity. 1 gramme, warmed with 10 millilitres of *solution of sodium hydroxide*, does not produce an odour of ammonia (limit of ammonium compounds).

Dissolve 1 gramme in 20 millilitres of *water*, and add a slight excess of *dilute solution of ammonia*; no blue colour is produced (limit of copper); add *hydrogen sulphide*; no precipitate is produced (limit of zinc).

1 gramme complies with the *limit test for chlorides*, and with the *limit test for sulphates*.

Arsenic limit, 2 parts per million. *Lead limit*, 10 parts per million.

Assay. Dissolve about 0·6 gramme, accurately weighed, in 50 millilitres of *water*, add 6·5 millilitres of *nitrogen-free sulphuric acid*, diluted with 13·5 millilitres of *water*, and 10 grammes of *reduced iron*; boil for five minutes in a conical flask, fitted with a thistle tube half filled with glass beads, wash the beads and tube by pouring in 20 millilitres of *water*, and boil again for three minutes. Transfer to an ammonia distillation apparatus, add 60 millilitres of *solution of sodium hydroxide*, and distil off the ammonia; collect the distillate in 100 millilitres of *N/10 sulphuric acid*, and titrate the excess of acid with *N/10 sodium hydroxide*, using *solution of methyl red* as indicator. Repeat the operation without the potassium nitrate. The difference between the two titrations represents the acid required to neutralise the ammonia formed from the potassium nitrate. Each millilitre of *N/10 sulphuric acid* is equivalent to 0·01011 gramme of KNO_3.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	5 to 15 grains.

POTASSII PERMANGANAS

[Pot. Permang.]

Potassium Permanganate

$KMnO_4$. . . . . . Mol. Wt. 158·0

Potassium Permanganate may be obtained by the action of carbon dioxide on an aqueous solution of potassium manganate. It contains not less than 99 per cent. of $KMnO_4$.

Characters. Dark purple, slender, prismatic crystals, having a metallic lustre; odourless; taste, sweet and astringent.

Soluble in 20 parts of *water*, forming a purple solution.

Tests for Identity. An aqueous solution, acidified with *sulphuric acid*, is decolourised by reducing agents.

Heated to redness, it decrepitates, evolves oxygen, and leaves a black residue from which *water* extracts potassium hydroxide; the resulting solution yields the *reactions* characteristic of potassium.

Tests for Purity. Dissolve 1 gramme in 50 millilitres of boiling *water*, heat on a water-bath, and add gradually 4 millilitres, or a sufficient quantity, of *alcohol* (*95 per cent.*) until the meniscus is colourless; filter; 20 millilitres of the filtrate complies with the *limit test for chlorides*, and with the *limit test for sulphates.*

Assay. Dissolve about 0·8 gramme, accurately weighed, in *water*, and dilute to 250 millilitres. Titrate with this solution 25 millilitres of *N/10 oxalic acid*, mixed with 5 millilitres of *sulphuric acid* and 25 millilitres of *water* and heated to about 60°. Each millilitre of *N/10 oxalic acid* is equivalent to 0·003161 gramme of $KMnO_4$.

DOSES

Metric.	Imperial.
0·06 to 0·2 gramme.	1 to 3 grains.

POTASSII TARTRAS ACIDUS

[Pot. Tart. Acid.]

Potassium Acid Tartrate

Synonym. Purified Cream of Tartar.

$COOH{\cdot}(CHOH)_2{\cdot}COOK$ . . Mol. Wt. 188·1

Potassium Acid Tartrate may be prepared by the purification of the deposit, obtained during the fermentation of grape juice. It contains not less than 99·5 per cent. of $C_4H_5O_6K$, calculated with reference to the substance dried at 100°.

Characters. Colourless, slightly opaque crystals, or a gritty, white, crystalline powder; taste, pleasant and acid.

Soluble in 220 parts of *water*, and in 16 parts of boiling *water*; insoluble in *alcohol* (*90 per cent.*).

Tests for Identity. Yields the *reactions* characteristic of potassium, and of tartrates.

An aqueous solution is acid in reaction.

Tests for Purity. Dissolve 2 grammes in 40 millilitres of *water* and 5 millilitres of *dilute solution of ammonia*, and add 5 drops of *solution of sodium sulphide PbT*; the colour produced is not more than slightly deeper than that given by a similar solution, containing in addition 1 millilitre of *solution of potassium cyanide PbT* (limit of copper, and of iron).

Shake 1 gramme with 20 millilitres of *alcohol* (*90 per cent.*), filter, and evaporate 10 millilitres of the filtrate to dryness; the residue weighs not more than 0·001 gramme (limit of free tartaric acid).

1 gramme, dissolved by heat, complies with the *limit test for chlorides* and with the *limit test for sulphates.*

Arsenic limit, 2 parts per million. *Lead limit*, 20 parts per million.

Loses, when dried at 100°, not more than 1 per cent. of its weight.

Assay. Dissolve about 1·5 grammes, accurately weighed, in 100 millilitres of boiling *water*, and titrate, while hot, with *N/5 sodium hydroxide*, using *solution of phenolphthalein* as indicator. Each millilitre of *N/5 sodium hydroxide* is equivalent to 0·03763 gramme of $C_4H_5O_6K$.

Preparations. Confectio Sulphuris.
Pulvis Jalapæ Compositus.

DOSES

Metric.	**Imperial.**
1 to 4 grammes.	**15 to 60 grains.**

PROCAINÆ HYDROCHLORIDUM

[Procain. Hydrochlor.]

Procaine Hydrochloride

Synonym. Ethocaine Hydrochloride.

$NH_2{\cdot}C_6H_4{\cdot}CO_2{\cdot}C_2H_4N(C_2H_5)_2$, HCl . Mol. Wt. 272·6

Procaine Hydrochloride is the hydrochloride of the base, prepared by the interaction of chloroethyldiethylamine and sodium *p*-aminobenzoate.

Characters. Colourless, crystalline powder; odourless; taste, weakly bitter, and followed by a transient insensibility of the tongue. Stable in air.

Soluble in 1 part of *water*, and in 8 parts of *alcohol (90 per cent.)*.

An aqueous solution is neutral to *litmus*.

Tests for Identity. A 10 per cent. w/v aqueous solution remains unchanged on the addition of *solution of sodium bicarbonate*, but on the addition of *solution of sodium hydroxide*, or of *solution of sodium carbonate*, a colourless oily precipitate is produced, which soon becomes crystalline. When the crystals are dissolved in *light petroleum (boiling-point, 50° to 60°)*, and the solvent evaporated, the residue has a *melting-point* of 58° to 60°.

Dissolve 0·1 gramme in 5 millilitres of *water*, and add 2 drops each of *hydrochloric acid* and of a 10 per cent. w/v aqueous solution of *sodium nitrite*; add this to a solution, made by dissolving 0·2 gramme of *β-naphthol* in a mixture of 3 millilitres of *solution of sodium hydroxide* and 7 millilitres of *water*; a scarlet precipitate is produced.

Dissolve 0·1 gramme in 5 millilitres of *water*, add 3 drops of *dilute sulphuric acid*, and then 5 drops of *N/10 potassium permanganate*; the colour of the latter is immediately discharged (distinction from cocaine hydrochloride).

An aqueous solution yields a precipitate with *solution of iodine* (distinction from orthocaine), and with *solution of potassio-mercuric iodide* (distinction from benzocaine and orthocaine).

An aqueous solution yields the *reactions* characteristic of chlorides.

Tests for Purity. *Melting-point*, 154° to 156°.

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; the solution is colourless (limit of readily carbonisable substances).

0·2 gramme leaves, on incineration, not more than 0·0002 gramme of residue.

Sterilisation of a Solution. A solution of Procaine Hydrochloride for injection is sterilised by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass*.

DOSES

Metric.	**Imperial.**
0·03 to 0·12 gramme.	**$^1/_2$ to 2 grains.**
By subcutaneous injection.	
up to 1 gramme.	**up to 15 grains.**
By intrathecal injection.	
up to 0·15 gramme.	**up to $2^1/_2$ grains.**

PRUNUS SEROTINA

[Prun. Serot.]

Wild Cherry Bark

Synonyms. Pruni Virginianæ Cortex : Prunus Virginiana.

Wild Cherry Bark is the bark of *Prunus serotina* Ehrh., collected in the autumn. It contains not more than 2 per cent. of other organic matter.

Characters. Curved or channelled pieces or irregular fragments not more than three millimetres thick; either covered with a smooth, thin, reddish-brown to brownish-black papery cork, frequently exfoliating, and containing numerous transversely elongated lenticels, or exhibiting externally, when the cork has been removed, a greenish-brown cortex, marked with similar lenticels of a pale buff colour; inner surface, reddish-brown, finely striated or reticulately fissured; fracture, short and granular. Throughout the tissues of the bark, numerous sclerenchymatous cells, mostly in groups and often branched; typical phloem fibres absent. In the parenchyma minute starch grains and, in the neighbourhood of the sclerenchyma, prismatic crystals, and occasionally cluster crystals, of calcium oxalate. Odour, slight; taste, astringent, aromatic and bitter, recalling that of bitter almonds.

Preparation. Syrupus Pruni Serotinæ.

DOSES

Metric.	**Imperial.**
1 to 2 grammes.	**15 to 30 grains.**

PULVIS CRETÆ AROMATICUS

[Pulv. Cret. Aromat.]

Aromatic Powder of Chalk

Chalk, finely powdered	250 grammes
Cinnamon, finely powdered	100 grammes
Nutmeg, finely powdered	80 grammes
Clove, finely powdered	40 grammes
Cardamom, finely powdered	30 grammes
Sucrose, finely powdered	500 grammes

Mix.

Preparation. Pulvis Cretæ Aromaticus cum Opio.

DOSES

Metric.	**Imperial.**
0·6 to 4 grammes.	**10 to 60 grains.**

PULVIS CRETÆ AROMATICUS CUM OPIO

[Pulv. Cret. Aromat. c. Opio]

Aromatic Powder of Chalk with Opium

Aromatic Powder of Chalk with Opium contains 2·5 per cent. of Powdered Opium, equivalent to 0·25 per cent. of anhydrous morphine (limits, 0·235 to 0·265).

Aromatic Powder of Chalk .	975 grammes
Powdered Opium . . .	25 grammes

Mix.

DOSES

Metric.	Imperial.
0·6 to 4 grammes.	10 to 60 grains.

Aromatic Powder of Chalk with Opium contains in 4 grammes 0·01 gramme, or in 60 grains about 1/7 grain, of anhydrous morphine.

PULVIS EFFERVESCENS COMPOSITUS

[Pulv. Efferv. Co.]

Compound Effervescent Powder

Synonyms. Pulvis Sodæ Tartaratæ Effervescens: Effervescent Tartarated Soda Powder: Seidlitz Powder.

No. 1.

Sodium Potassium Tartrate, in dry powder	7·5 grammes
Sodium Bicarbonate, in dry powder	2·5 grammes

Mix and wrap in blue paper.

No. 2.

Tartaric Acid, in dry powder .	2·5 grammes

Wrap in white paper.

DOSE

Dissolve No. 1 powder in a tumbler of cold or warm water; then add No. 2 powder. The liquid should be taken while effervescing.

PULVIS GLYCYRRHIZÆ COMPOSITUS

[Pulv. Glycyrrh. Co.]

Compound Powder of Liquorice

Senna Leaf, finely powdered .	160 grammes
Liquorice, peeled, finely powdered	160 grammes
Fennel, finely powdered . .	80 grammes
Sublimed Sulphur . . .	80 grammes
Sucrose, finely powdered . .	520 grammes

Mix.

DOSES

Metric.	Imperial.
4 to 8 grammes.	**60 to 120 grains.**

PULVIS IPECACUANHÆ ET OPII

[Pulv. Ipecac. et Opii]

Powder of Ipecacuanha and Opium

Synonyms. Pulvis opii et Ipecacuanhæ Compositus I.A.: Pulvis Ipecacuanhæ Compositus: Compound Powder of Ipecacuanha: Dover's Powder.

Powder of Ipecacuanha and Opium contains 10 per cent. of Powdered Opium, equivalent to 1 per cent. of anhydrous morphine (limits, 0·95 to 1·05).

Powdered Ipecacuanha . .	100 grammes
Powdered Opium . . .	100 grammes
Lactose, finely powdered . .	800 grammes

Mix.

DOSES

Metric.	Imperial.
0·3 to 0·6 gramme.	**5 to 10 grains.**

Powder of Ipecacuanha and Opium contains in 0·6 gramme 0·006 gramme, or in 10 grains $^1/_{10}$ grain, of anhydrous morphine.

PULVIS JALAPÆ COMPOSITUS

[Pulv. Jalap. Co.]

Compound Powder of Jalap

Powdered Jalap	300 grammes
Potassium Acid Tartrate, finely powdered	600 grammes
Ginger, finely powdered . .	100 grammes

Mix.

DOSES

Metric.	Imperial.
0·6 to 4 grammes.	**10 to 60 grains.**

PULVIS RHEI COMPOSITUS

[Pulv. Rhei Co.]

Compound Powder of Rhubarb

Synonym. Gregory's Powder.

Rhubarb, finely powdered	250 grammes
Heavy Magnesium Carbonate	325 grammes
Light Magnesium Carbonate	325 grammes
Ginger, finely powdered	100 grammes

Mix.

DOSES

Metric.	Imperial.
0·6 to 4 grammes.	10 to 60 grains.

PULVIS TRAGACANTHÆ COMPOSITUS

[Pulv. Trag. Co.]

Compound Powder of Tragacanth

Tragacanth, finely powdered	150 grammes
Acacia, finely powdered	200 grammes
Starch, finely powdered	200 grammes
Sucrose, finely powdered	450 grammes

Mix.

DOSES

Metric.	Imperial.
0·6 to 4 grammes.	10 to 60 grains.

PYROXYLINUM

[Pyroxylin.]

Pyroxylin

Pyroxylin is a nitrated cellulose, obtained by the action of a mixture of nitric and sulphuric acids on cotton wool, which has been freed from fatty matter, and by subsequent purification. It contains, when dry, not less than 11·5 per cent., and not more than 12·3 per cent., of nitrogen.

Characters. A white, matted mass of filaments, resembling cotton-wool, but somewhat harsher to the touch. Highly inflammable.

Tests for Purity. Readily soluble in a mixture of 1 volume of *alcohol* (*90 per cent.*) and 3 volumes of *ether*, yielding an almost clear and colourless solution; soluble in *acetone*.

Viscosity of a solution in *acetone* containing 3 per cent. w/v of the dry material, not less than 3 poises at 20°.

Assay. Rub a portion lightly through a sieve, place in a weighing bottle, and dry at 100° for one hour. Transfer to a mercury-filled nitrometer about 0·5 gramme, accurately weighed, with 5 millilitres of *nitrogen-free sulphuric acid*, and wash it in with four 2·5 millilitre portions of the same acid. Shake the nitrometer well for one minute, or until the evolution of gas ceases, and, after allowing it to stand for two minutes, again shake for one minute, and allow it to stand for a further fifteen minutes; measure the volume of liberated nitric oxide. Each millilitre of nitric oxide, at normal temperature and pressure, is equivalent to 0·000625 gramme of nitrogen.

Storage. Pyroxylin should be kept loosely packed, protected from light, and stored in a cool place. It may be kept moistened with Industrial Methylated Spirit.

Preparation. Collodium Flexile.

QUASSIA

[Quass.]

Quassia

Synonyms. Quassiæ Lignum: Quassia Wood.

Quassia is the stem-wood of *Picræna excelsa* (Sw.) Lindl., known in commerce as Jamaica quassia. It contains not more than 2 per cent. of other organic matter.

Characters. Chips or raspings, occasionally logs; yellowish-white or bright yellow, tough but easily split; composed mainly of vessels with small bordered pits, of wood-fibres with only moderately thick obliquely pitted walls, and of wood-parenchyma mainly in interrupted tangential bands; certain cells of both parenchyma and medullary rays contain large single prismatic crystals of calcium oxalate; starch grains, few. Odour, none; taste, intensely bitter.

Preparations. Infusum Quassiæ Concentratum.
Infusum Quassiæ Recens.
Tinctura Quassiæ.

DOSES

Metric.	**Imperial.**
0·12 to 0·5 gramme.	**2 to 8 grains.**

QUILLAIA

[Quill.]

Quillaia

Synonyms. Quillaiæ Cortex: Quillaia Bark.

Quillaia is the dried inner part of the bark of *Quillaja Saponaria* Molina, and of other species of *Quillaja.* It contains not more than 2 per cent. of other organic matter.

Characters. Flat pieces up to about one metre long, 20 centimetres broad, and 3 to 10 millimetres thick; outer surface, brownish-white with occasional reddish or blackish-brown patches of incompletely removed rhytidoma, longitudinally streaked or coarsely reticulated; inner surface, yellowish-white, smooth and hard; very tough; fracture, splintery and laminated, the broken surface showing, as glistening points, numerous large prisms of calcium oxalate; the transversely cut surface has a chequered appearance with delicate radial and tangential lines. Medullary rays, up to four cells wide; phloem fibres, tortuous and irregularly enlarged at intervals; occasional subrectangular stone cells; abundant small starch grains up to 20 microns, mostly 5 to 10 microns, in diameter; large crystals of calcium oxalate up to 160 microns long and 30 microns wide. Odourless; dust, strongly sternutatory; taste, acrid and astringent. When powdered and shaken with water, it forms a copious persistent froth.

Test for Purity. *Ash,* not more than 15 per cent.

Preparation. Tinctura Quillaiæ.

DOSES

Metric.	**Imperial.**
0·06 to 0·2 gramme.	**1 to 3 grains.**

QUINIDINÆ SULPHAS

[Quinidin. Sulph.]

Quinidine Sulphate

$(C_{20}H_{24}O_2N_2)_2,H_2SO_4,2H_2O$. Mol. Wt. 782·5

Quinidine Sulphate is the sulphate of an alkaloid, quinidine, obtained from the bark of various species of *Cinchona.*

Characters. Colourless, needle-like crystals; taste, very bitter. Darkens on exposure to light.

Soluble in about 90 parts of *water,* and in 10 parts of *alcohol (90 per cent.).*

An aqueous solution is neutral, or at the most weakly alkaline, to *litmus.*

Tests for Identity. To 5 millilitres of a 0·1 per cent. w/v aqueous solution add 2 or 3 drops of *solution of bromine*, and then 1 millilitre of *dilute solution of ammonia*; an emerald-green colour is produced.

To a 0·5 per cent. w/v aqueous solution add *dilute sulphuric acid*; a strong blue fluorescence is produced.

To 5 millilitres of a 1 per cent. w/v aqueous solution add 1 millilitre of *solution of silver nitrate*, and stir with a glass rod; after a short interval a white precipitate, soluble in *nitric acid*, is produced (distinction from many other alkaloids).

An aqueous solution is dextrorotatory (distinction from Quinine Sulphate).

An aqueous solution gives the *reactions* characteristic of sulphates.

Tests for Purity. Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

Warm 1 gramme with 5 millilitres of a mixture of 2 volumes of *chloroform* and 1 volume of *dehydrated alcohol*; a clear solution is obtained (absence of inorganic salts and other alkaloids).

Dissolve 0·5 gramme in 15 millilitres of boiling *water*, and add a solution of 0·5 gramme of *potassium iodide* in 5 millilitres of *water*, which has previously been neutralised, if necessary, to *litmus* with *N/10 sulphuric acid*; a white precipitate is formed. Cool the mixture to 15°, keeping it at this temperature for one hour, with frequent agitation. Filter, and add 2 drops of *dilute solution of ammonia* to the filtrate; no turbidity is produced within one minute (limit of other cinchona alkaloids).

0·5 gramme loses, when dried at 120°, not more than 0·025 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Quinidine Sulphate should be kept in a well-closed container, protected from light.

Metric.	DOSES	Imperial.
0·2 to 0·6 gramme.		**3 to 10 grains.**

QUINIMÆ BISULPHAS

[Quinin. Bisulph.]

Quinine Bisulphate

Synonym. Quinine Acid Sulphate.

$C_{20}H_{24}O_2N_2,H_2SO_4,7H_2O$. Mol. Wt. 548·4

Quinine Bisulphate is the bisulphate of an alkaloid, quinine, obtained from the bark of various species of *Cinchona*.

Characters. Fine, soft, white, matted needles; odourless; almost tasteless. Darkens on exposure to light.

Slightly soluble in *water*; soluble in 2 parts of *alcohol* (*90 per cent.*); readily soluble in dilute acids.

Tests for Identity. A saturated aqueous solution is slightly alkaline to *litmus.*

A solution in *dilute sulphuric acid* has a blue fluorescence.

To 5 millilitres of a 0·1 per cent. w/v aqueous solution, made with the aid of a slight excess of *dilute sulphuric acid,* add 2 or 3 drops of *solution of bromine,* and then 1 millilitre of *dilute solution of ammonia*; an emerald-green colour is produced.

To 0·5 gramme add 2 millilitres of *solution of sodium hydroxide* and 5 millilitres of *solution of iodine,* and warm gently; the odour of iodoform is given off.

Tests for Purity. *Melting-point,* not below 95°.

0·2 gramme complies with the *limit test for chlorides,* and with the *limit test for sulphates.*

0·5 gramme loses, when dried over *sulphuric acid* for twenty-four hours, not more than 0·01 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Quinine Ethyl Carbonate should be protected from light.

DOSES

Metric.	Imperial.
0·1 to 1 gramme.	**$1^1/_2$ to 15 grains.**

QUININÆ HYDROCHLORIDUM

[Quinin. Hydrochlor.]

Quinine Hydrochloride

$C_{20}H_{24}O_2N_2,HCl,2H_2O$ . . Mol. Wt. 396·7

Quinine Hydrochloride is the hydrochloride of an alkaloid, quinine, obtained from the bark of various species of *Cinchona.*

Characters. Colourless, glistening needles; odourless; taste, very bitter. Effloresces in warm air.

Soluble in 32 parts of *water,* and in 2 parts of *alcohol* (*90 per cent.*).

An aqueous solution is neutral, or at the most weakly alkaline, to *litmus.*

Tests for Identity. To 5 millilitres of a 0·1 per cent. w/v aqueous solution add 2 or 3 drops of *solution of bromine,* and then 1 millilitre of *dilute solution of ammonia*; an emerald-green colour is produced.

To a 0·5 per cent. w/v aqueous solution add *dilute sulphuric acid*; a strong blue fluorescence is produced.

An aqueous solution is lævorotatory.

An aqueous solution yields the *reactions* characteristic of chlorides.

Tests for Purity. A 4 per cent. w/v aqueous solution is not fluorescent.

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint yellow colour is produced; also dissolve 0·1 gramme in 2 millilitres of *nitric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

1 gramme dissolves completely in 7 millilitres of a mixture of 2 volumes of *chloroform* and 1 volume of *dehydrated alcohol* (limit of inorganic salts, and of other alkaloids).

To a 2 per cent. w/v solution in *water* add *dilute sulphuric acid*; no turbidity is produced (limit of barium).

Dissolve 1·2 grammes in 50 millilitres of *water*, containing 5 millilitres of *dilute sulphuric acid*; add 5 millilitres of *dilute solution of ammonia*, and shake the mixture successively with 30 and 20 millilitres of *chloroform*; separate each chloroform solution, and wash it with two successive quantities of 10 millilitres of *water*, using the same water for each solution. Mix the chloroform solutions, remove most, but not all, of the chloroform by evaporating on a water-bath; expel the last traces of chloroform by adding 3 to 4 millilitres of *dehydrated alcohol* and again evaporating quickly on a water-bath with the assistance of a current of air until the residue forms an opaque solid. Avoid reducing the residue to dryness, until after the chloroform has been completely expelled. Dissolve the residue in 20 millilitres of *alcohol* (*90 per cent.*), and add 20 millilitres of *water* and 1 millilitre of a 0·02 per cent. w/v solution of *methyl red* in *alcohol* (*90 per cent.*). Heat the solution to 75°; adjust the reaction at that temperature by the careful addition of *N/5 sulphuric acid*, until the colour of the solution is exactly the same as that of a solution at 20°, prepared by mixing 56 millilitres of *solution of pH 5·44* with 1 millilitre of a 0·02 per cent. w/v solution of *methyl red* in *alcohol* (*90 per cent.*). Neutralise only with the acid; do not use alkali. Evaporate the neutralised liquid to dryness in a dish of either porcelain or resistance glass on a water-bath; powder the dry residue; complete the test for limit of other cinchona alkaloids, as directed under 'Quininæ Sulphas', commencing with the words 'weigh 1 gramme and boil . . .' (limit of other cinchona alkaloids).

1 gramme complies with the *limit test for sulphates*.

0·5 gramme loses, when dried at 110°, not more than 0·05 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Sterilisation of a Solution. A solution of Quinine Hydrochloride for injection is sterilised by *heating in an autoclave*, or by *Tyndallisation*, or by *filtration.*

DOSES

Metric.	Imperial.
0·06 to 0·6 gramme.	1 to 10 grains.

QUININÆ SULPHAS

[Quinin Sulph.]

Quinine Sulphate

$(C_{20}H_{24}O_2N_2)_2,H_2SO_4,7\frac{1}{2}H_2O$ Mol. Wt. 881·6

Quinine Sulphate is the sulphate of an alkaloid, quinine, obtained from the bark of various species of *Cinchona.*

Characters. Colourless, glistening, silky needles; odourless; taste, intensely bitter. Effloresces rapidly and loses all except 2 molecules of its water of crystallisation, when exposed to dry air, or when heated to 50°.

Soluble in 800 parts of *water*, and in 65 parts of *alcohol (90 per cent.)*.

An aqueous solution is neutral, or at the most weakly alkaline, to *litmus.*

Tests for Identity. To 5 millilitres of a 0·1 per cent. w/v aqueous solution add 2 or 3 drops of *solution of bromine*, and then 1 millilitre of *dilute solution of ammonia*; an emerald-green colour is produced.

To a few drops of a saturated aqueous solution add 1 drop of *dilute sulphuric acid*; a strong blue fluorescence is produced.

An aqueous solution is lævorotatory (distinction from Quinidine Sulphate).

An aqueous solution gives the *reactions* characteristic of sulphates.

Tests for Purity. Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint yellow colour is produced; also dissolve 0·1 gramme in 2 millilitres of *nitric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

1 gramme dissolves completely in 7 millilitres of a mixture of 2 volumes of *chloroform* and 1 volume of *dehydrated alcohol* when heated to 50°; the solution remains clear on cooling (limit of inorganic salts, and of other alkaloids).

Dry at 50° for two hours; weigh 1 gramme, and boil it with 30 millilitres of *water* in a 100 millilitre resistance glass flask fitted with a reflux condenser, for one or two minutes, by the end of which time complete solution will have been almost entirely effected. Cool the liquid rapidly to 15° by means of water at that temperature, cork the flask and shake vigorously until cooled. Maintain the liquid at 15° for a further period of half an hour, shaking it frequently; filter rapidly through a filter paper, having a diameter of 8 to 10 centimetres; transfer 5 millilitres of the clear filtrate at 15° to a test-tube; add to it all at once 6·5 millilitres of a solution of ammonia, which must contain not less than 10 per cent. w/w, and not more than 10·2 per cent. w/w, of NH_3 and have a temperature of 15°; mix gently without shaking; a clear liquid is produced at 15° (limit of other cinchona alkaloids).

0·5 gramme loses, when dried at 100°, not less than 0·055 gramme, and not more than 0·08 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Storage. Quinine Sulphate should be kept in a well-closed container, protected from light.

Preparations. Liquor Quininæ Ammoniatus.
Syrupus Ferri Phosphatis cum Quinina et Strychnina.

DOSES

Metric.	**Imperial.**
0·06 to 0·6 gramme.	**1 to 10 grains.**

QUININÆ TANNAS

[Quinin. Tann.]

Quinine Tannate

Quinine Tannate is a compound of tannic acid with an alkaloid, quinine, obtained from the bark of various species of *Cinchona*. It contains not less than 30 per cent., and not more than 35 per cent., of anhydrous quinine.

Characters. A pale yellow or yellowish-white, amorphous powder; taste, astringent, and not more than slightly bitter.

Slightly soluble in *water*; soluble in *alcohol (90 per cent.)*.

Tests for Identity. When heated, it melts to a purplish, viscous mass.

A saturated, aqueous or alcoholic, solution is coloured blue-black by *solution of ferric chloride*.

When the alkaloid, obtained in the assay, is neutralised to *litmus* with *dilute sulphuric acid*, and the solution evaporated to dryness, the residue responds to the Tests for Identity given under 'Quininæ Sulphas'.

Tests for Purity. Shake 1 gramme with 25 millilitres of dry *ether* for five minutes, filter, and wash the filter with 10 millilitres of dry *ether*; remove the ether, dry the residue at 100°, and weigh; the weight does not exceed 0·005 gramme (limit of free quinine).

Shake 3·3 grammes, previously powdered, with 15 millilitres of *solution of sodium hydroxide* to form a uniform paste. Add 100 millilitres of *ether*, and shake vigorously for five minutes. Add 2 grammes of powdered *tragacanth*, shake, decant the ethereal solution into a separator, wash it with three successive quantities of 20 millilitres of *water* and reject the washings. Extract the ethereal solution with 5 millilitres of *dilute sulphuric acid* diluted with 5 millilitres of *water*, and then with two successive quantities of ·20 millilitres of *water*. Mix the acid and aqueous solutions, and remove the ether; complete the test for limit of other cinchona alkaloids described under 'Quininæ Hydrochloridum', commencing with the words 'add 5 millilitres of *dilute solution of ammonia* . . .' (limit of other cinchona alkaloids).

Shake 0·5 gramme with 50 millilitres of *water* and 1 millilitre of *dilute nitric acid* for five minutes, and filter. The filtrate complies with the following tests:—

10 millilitres is not coloured by 1 millilitre of *solution of hydrogen sulphide* (absence of heavy metals).

20 millilitres complies with the *limit test for chlorides*.

5 millilitres complies with the *limit test for sulphates*.

0·5 gramme loses, when dried at 100°, not more than 0·05 gramme; and leaves, on incineration, not more than 0·0015 gramme of residue.

Assay. Transfer about 0·5 gramme, accurately weighed, to a separator, add 10 millilitres of *water* and 10 millilitres of *dilute solution of ammonia*; extract by shaking with 20 millilitres of *ether*, separate the ethereal solution, and wash it with 5 millilitres of *water*. Repeat the extraction with three successive 10 millilitre quantities of *ether*, washing each ethereal solution with the 5 millilitres of the water first used for washing. Evaporate the mixed ethereal solutions, dry the residue at 100°, and weigh the anhydrous quinine.

Storage. Quinine Tannate should be kept in a well-closed container, protected from light.

DOSES

Metric.	Imperial.
0·1 to 1 gramme.	1½ to 15 grains.

RESORCINOL

[Resorcin.]

Resorcinol

Synonyms. Resorcinum: Resorcin.

$C_6H_4(OH)_2$ [OH : OH = 1 : 3] Mol. Wt. 110·0

Resorcinol, *m*-dihydroxybenzene, may be obtained by the interaction of sodium hydroxide and sodium *m*-benzenedisulphonate.

Characters. Colourless, or nearly colourless, acicular crystals or powder; odour, slight but characteristic; taste, sweetish and then bitter. Sublimes on heating.

Soluble in less than 1 part of *water*, in 1 part of *alcohol* (*90 per cent.*), in *ether*, in *glycerin*, and in *olive oil.*

Tests for Identity. To 10 millilitres of a 1 per cent. w/v aqueous solution add 2 drops of *test-solution of ferric chloride*; a bluish-violet colour is produced, changing to brownish-yellow on the addition of *dilute solution of ammonia* (distinction from catechol, and from quinol).

Dissolve 0·1 gramme in 2 millilitres of *solution of sodium hydroxide*, add 1 drop of *chloroform*, and heat the mixture; an intense crimson colour is produced, which changes to pale yellow on the addition of a slight excess of *hydrochloric acid.*

An alkaline solution exhibits a strong greenish fluorescence, and darkens in colour.

Tests for Purity. *Melting-point,* 110° to 111°.

A 5 per cent. w/v aqueous solution is neutral, or only slightly acid, to *litmus*, and, when gently warmed, does not emit the odour of phenol.

To a 5 per cent. w/v aqueous solution add *solution of lead acetate*; no precipitate is formed (absence of catechol).

Leaves, on incineration, not more than 0·05 per cent. of residue.

Storage. Resorcinol should be kept in a well-closed container, protected from light.

DOSES

Metric.	**Imperial.**
0·06 to 0·3 gramme.	**1 to 5 grains.**

RHEUM

[Rheum]

Rhubarb

Synonym. Rhei Rhizoma.

Rhubarb is the rhizome of *Rheum palmatum* Linn. and possibly other species of *Rheum*, cultivated in China and Tibet, deprived of most of its bark, and dried. It contains not more than 2 per cent. of other organic matter.

Characters. Compact, firm, subcylindrical, barrel-shaped, conical or plano-convex pieces, often perforated by a hole; sometimes vaguely prismatic, but not shrunken, marked with reddish-brown lines embedded in a whitish matrix, and usually covered with a bright brownish-yellow powder; fracture, granular and uneven, the pinkish-brown or greyish fractured surface exhibiting numerous reddish-brown points and lines on a white ground substance; smoothed transverse surface usually showing near the periphery a cambium line, within this for a short distance a radiate xylem, and next to this a more or less distinct circle of closely approximated vascular strands with central phloem and radiating reddish-brown medullary rays. In the parenchyma, abundant starch grains, up to about 20 microns in diameter, simple or compound with up to about 5 components, large cluster crystals of calcium oxalate frequently exceeding 100 microns in diameter, and an amorphous yellow substance insoluble in *alcohol* (*90 per cent.*), soluble in *water*, and assuming a reddish-pink colour with *dilute solution of ammonia*; vessels and other elements of the xylem giving no *reaction* for lignin; cork, sclerenchymatous fibres and cells absent. Odour, characteristic and somewhat aromatic; taste, bitter and slightly astringent.

Tests for Purity. *Ash*, not more than 15 per cent.; *alcohol* (*45 per cent.*)*-soluble extractive*, not less than 35 per cent.

Preparations. Pilula Rhei Composita.
Pulvis Rhei Compositus.
Tinctura Rhei Composita.

DOSES

Metric.	**Imperial.**
0·2 to 1 gramme.	**3 to 15 grains.**

SACCHARINUM SOLUBILE

[Saccharin. Solub.]

Soluble Saccharin

$\overline{CO\cdot C_6H_4\cdot SO_2N}Na,2H_2O$ . . Mol. Wt. 241·1

Soluble Saccharin is the sodium derivative of *o*-benzoic-sulphinide, and is prepared by neutralising *o*-benzoic-

sulphinide with sodium hydroxide, or with sodium bicarbonate. It contains not less than 98 per cent. of $C_7H_4O_3NSNa,2H_2O$.

Characters. A white crystalline powder; odourless, or with a faint aromatic odour; taste, intensely sweet, even in dilute solution.

Soluble at 25° in 1·5 parts of *water*, and in 50 parts of *alcohol (95 per cent.)*.

Tests for Identity. Mix about 0·02 gramme with about twice its weight of *resorcinol*, add 10 drops of *sulphuric acid*, and heat the mixture over a small flame, until it assumes a dark green colour; allow to cool, and add 10 millilitres of *water* and an excess of *solution of sodium hydroxide*; a fluorescent green liquid is produced.

Dissolve about 0·1 gramme in 5 millilitres of a 10 per cent. w/v aqueous solution of *sodium hydroxide*, evaporate the solution to dryness, and gently fuse the residue over a small flame, until ammonia is no longer evolved; allow to cool, dissolve in 20 millilitres of *water*, neutralise the solution with *dilute hydrochloric acid*, and filter; on the addition of a drop of *test-solution of ferric chloride* a violet colour is produced.

The residue, left on incineration, yields the *reactions* characteristic of sodium, and of sulphates.

Tests for Purity. An aqueous solution is slightly acid to *litmus*.

To 10 millilitres of a 6 per cent. w/v aqueous solution add 5 drops of *acetic acid* and 3 drops of *test-solution of ferric chloride*; no precipitate or violet colour is produced (absence of benzoates, and of salicylates).

Dissolve 1 gramme in 10 millilitres of *water*, and add 1 millilitre of *hydrochloric acid*; a crystalline precipitate is produced which, when washed and dried, has a *melting-point* not below 226°.

Dissolve 0·7 gramme in 10 millilitres of water, add 2 millilitres of *dilute hydrochloric acid*, evaporate to dryness, and heat for two hours at about 100°; wash the residue into a flask, and titrate with *N/10 sodium hydroxide*, using *solution of phenolphthalein* as indicator. The volume of *N/10 sodium hydroxide* required does not exceed the volume of *N/10 sulphuric acid*, neutralised by the ammonia in the assay, by more than 0·5 millilitre (limit of *p*-sulphaminobenzoic acid).

Lead limit, 10 parts per million.

Assay. Transfer 0·7 gramme to a long-necked flask, having a capacity of 200 millilitres, and add 10 millilitres of a 30 per cent. w/v aqueous solution of *sodium hydroxide*; boil over a small flame for two minutes, avoiding loss by evaporation; cool, add 15 millilitres of *hydrochloric acid*, and boil again for fifty minutes under a reflux condenser. Cool, rinse the condenser with 50 millilitres of *water*, and pass a current of air through the flask to remove acid vapour. Connect with an ammonia distillation apparatus, add 20 millilitres of a 30 per cent. w/v aqueous solution of *sodium hydroxide*, and distil the ammonia into 40 millilitres of *N/10 sulphuric acid*; titrate the excess of acid with *N/10 sodium hydroxide*, using *solution of methyl red* as indicator. Each millilitre of *N/10 sulphuric acid*, neutralised by the ammonia in the distillate, is equivalent to 0·02411 gramme of soluble saccharin, $C_7H_4O_3NSNa,2H_2O$.

DOSES

Metric.	**Imperial.**
0·03 to 0·12 gramme.	**$^1/_2$ to 2 grains.**

SALICINUM

[Salicin.]

Salicin

$C_{13}H_{18}O_7$ . . . . Mol. Wt. 286·1

Salicin is a glucoside, which may be obtained from the bark of various species of *Salix*, and of *Populus*.

Characters. Colourless crystals, or a white crystalline powder; odourless; taste, very bitter.

Soluble in 28 parts of *water*, and in 80 parts of *alcohol* (*90 per cent.*); insoluble in *ether*, and in *chloroform*.

Tests for Identity. Add a little to a few drops of *sulphuric acid*; a red colour is produced, which disappears on the addition of *water*.

Heat gently about 0·1 gramme with about 0·2 gramme of *potassium dichromate* and 2 millilitres of *dilute sulphuric acid*; the odour of salicylic aldehyde is developed.

Tests for Purity. *Melting-point*, 199° to 201°; *specific rotation* in a 3 per cent. w/v solution in *water*, − 63° to − 66°.

To 5 millilitres of a 2 per cent. w/v aqueous solution add one drop of *test-solution of ferric chloride*; no violet colour is produced (absence of salicylic acid, and of saligenin).

Leaves, on incineration, not more than 0·05 per cent. of residue.

DOSES

Metric.	**Imperial.**
0·3 to 1 gramme.	**5 to 15 grains.**

SANTONINUM

[Santonin.]

Santonin

$C_{15}H_{18}O_3$ . . . . . Mol. Wt. 246·1

Santonin is a crystalline principle, which may be obtained from santonica, the dried unexpanded flowerheads of *Artemisia cina* Berg, and other species of *Artemisia.*

Characters. Colourless, flat, rhombic prisms, or a white crystalline powder; odourless; taste, at first absent, but afterwards very slightly bitter. When exposed to sunlight, it becomes yellow.

Almost insoluble in *water*; soluble in 50 parts of *alcohol* (*90 per cent.*), and in 2·5 parts of *chloroform.*

Tests for Identity and Purity. *Melting-point,* 171° to 174°.

0·1 gramme in 5 millilitres of *alcohol* (*90 per cent.*) forms a clear solution, neutral to *litmus.*

0·01 gramme, warmed with 1 millilitre of *alcoholic solution of potassium hydroxide,* yields a violet-red colour.

When 2 millilitres of *sulphuric acid* is poured over 0·1 gramme in a test-tube, the crystals are not darker than pale brown, and, when dissolved without heat, produce a clear solution which is not darker than yellow (limit of readily carbonisable substances).

Leaves, on incineration, not more than 0·1 per cent. of residue.

Storage. Santonin should be protected from light.

DOSES

Metric.	Imperial.
0·06 to 0·2 gramme.	1 to 3 grains.

SAPO ANIMALIS

[Sap. Animal.]

Curd Soap

Curd Soap is soap made from sodium hydroxide and purified solid animal fats.

Characters. A yellowish-white or greyish-white substance; nearly odourless. Easily moulded, when heated, and becoming horny and pulverisable, when dried.

Sparingly soluble in cold *water*; completely soluble in hot *water*; almost completely soluble in *alcohol* (*90 per cent.*).

Tests for Purity. Dissolve 2·5 grammes in 50 millilitres of boiling *alcohol* (*95 per cent.*), previously neutralised to *phenolphthalein*, filter while hot, and wash the filter thoroughly with boiling neutralised *alcohol* (*95 per cent.*); the filtrate requires for neutralisation not more than 0·2 millilitre of *N/10 sulphuric acid*, or of *N/10 sodium hydroxide*, *solution of phenolphthalein* being used as indicator (limit of alkali hydroxide, or of free fatty acid). Wash the filter with hot *water*, and titrate the washings with *N/10 sulphuric acid*, using *solution of methyl orange* as indicator; not more than 2·0 millilitres is required for neutralisation (limit of alkali carbonate).

Dissolve 5 grammes in a mixture of 12·5 millilitres of *alcohol* (*95 per cent.*) and 12·5 millilitres of *water*; wash this solution into a separator with 40 millilitres of *water*, and extract the mixture with successive quantities of *ether*, as directed for the *determination of unsaponifiable matter in fixed oils and fats*; the weight of the residue does not exceed 0·025 gramme (limit of free fat).

The *solidifying-point* of the fatty acids is not less than 42°, the fatty acids being prepared by the following process:—

> Dissolve about 20 grammes in hot *water*, add a slight excess of *dilute sulphuric acid*, and heat on a water-bath, until the liberated fatty acids form a transparent layer. Separate the fatty acids on a wet filter-paper, and wash with hot *water*, until the washings are neutral to *methyl orange*. Filter the oily layer through a dry filter-paper in a warm oven.

Loses, when dried at 110°, not less than 20 per cent., and not more than 30 per cent., of its weight.

Curd Soap in powder loses, when dried at 110°, not more than 5 per cent. of its weight.

SAPO DURUS

[Sap. Dur.]

Hard Soap

Hard Soap is soap made from sodium hydroxide and olive oil.

Characters. A greyish-white, yellowish-white, or greenish-white substance; nearly odourless. Becomes horny and pulverisable, when dried.

Soluble in 20 parts of cold *water*, and in 1·5 parts of hot *water*; almost completely soluble in *alcohol* (*90 per cent.*), and more readily soluble when warmed.

Tests for Purity. Complies with the tests for limit of alkali hydroxide, or of free fatty acid, for limit of alkali carbonate, and for limit of free fat, described under 'Sapo Animalis'.

Dissolve 10 grammes in 100 millilitres of *alcohol* (*95 per cent.*), previously neutralised to *phenolphthalein*, filter through a dried and tared filter, wash the residue thoroughly with hot neutralised *alcohol* (*95 per cent.*), and dry at 100°; the weight of the residue is not more than 0·1 gramme (limit of chloride and other alcohol-insoluble substances).

The fatty acids prepared in the manner described under 'Sapo Animalis' have the following characters:—*solidifying-point*, 18° to 23°; *refractive index* at 40°, 1·454 to 1·458; *acid value*, 195 to 205; *iodine value*, 83 to 92. They also comply with the *test for the absence of cottonseed oil, of sesame oil, and of arachis oil.*

Loses, when dried at 110°, not less than 20 per cent., and not more than 30 per cent., of its weight.

Hard Soap in powder loses, when dried at 110°, not more than 5 per cent. of its weight.

SAPO MOLLIS

[Sap. Moll.]

Soft Soap

Soft Soap is soap made from potassium hydroxide and olive oil. It yields not less than 44 per cent. of the fatty acids of olive oil.

Characters. A yellowish-white to green, unctuous substance; nearly odourless.

Soluble in *water*, and in *alcohol* (*90 per cent.*).

Tests for Purity. Dissolve 5 grammes in 100 millilitres of hot *alcohol* (*90 per cent.*), previously neutralised to *phenolphthalein*, filter through a dried and tared filter, wash the residue thoroughly with hot neutralised *alcohol* (*95 per cent.*), and dry at 100°; the weight of the residue is not more than 0·15 gramme (limit of chlorides and other alcohol-insoluble substances).

Dissolve 5 grammes in 100 millilitres of hot *alcohol* (*95 per cent.*), previously neutralised to *phenolphthalein*, add 10 millilitres of *solution of barium chloride*, allow to stand for a few minutes, decant off the clear supernatant liquid, and titrate it with *N/10 sulphuric acid*, using *solution of phenolphthalein* as indicator. Extract the insoluble barium salts with a further 50 millilitres of neutralised *alcohol* (*95 per cent.*), set aside, decant, and titrate as before; the sum of the two titrations does not exceed 0·5 millilitre (limit of alkali hydroxide).

Dry 5 grammes at 100° for one hour, dissolve in 100 millilitres of hot *alcohol* (*95 per cent.*), previously neutralised to *phenolphthalein*, filter, and wash the filter thoroughly with boiling neutralised *alcohol* (*95 per cent.*); the filtrate requires not more than 0·2 millilitre of *N/10 sodium hydroxide* for neutralisation, *solution of phenolphthalein* being used as indicator (limit of free fatty acid). Wash the filter with hot *water*, and titrate the washings with *N/10 sulphuric acid*, using *solution of methyl orange* as indicator; not more than 2·5 millilitres is required (limit of alkali carbonate).

Complies with the test for limit of free fat, described under 'Sapo Animalis.'

The fatty acids, obtained in the Assay, have the characters of the fatty acids described under 'Sapo Durus'.

Assay. *For fatty acids.* Dissolve about 20 grammes, accurately weighed, in 100 millilitres of *water*, transfer to a separator, acidify with *dilute sulphuric acid*, and extract with three successive quantities of 70 millilitres of *light petroleum* (*boiling-point, 50° to 60°*). Mix the petroleum solutions in a separator, and wash with *water*, until the washings are free from mineral acid. Transfer the petroleum solution to a weighed flask, remove the solvent, dry the residue at 80°, and weigh.

Preparation. Linimentum Saponis.

SCAMMONIÆ RESINA

[Scammon. Res.]

Scammony Resin

Synonym. Resin of Ipomœa.

Scammony Resin is a mixture of resins, obtained from Ipomœa.

Characters. Brownish, translucent, brittle fragments, breaking with a resinous fracture, or a pale brown powder; odour, characteristic and agreeable; taste, acrid.

Insoluble in *water*; soluble in *alcohol* (*90 per cent.*); wholly, or partly, soluble in *ether*.

Tests for Identity and Purity. Shake 1 gramme, finely powdered, with 20 millilitres of cold *water* for five minutes, filter, wash the residue with 5 millilitres of cold *water*, evaporate the filtrate and washings, dry the residue at 100°, and weigh; the weight does not exceed 0·01 gramme.

Dissolve 0·1 gramme in 10 millilitres of *solution of sodium hydroxide*, boil for a few moments, cool, and acidify with *hydrochloric acid*; the solution may become opalescent, but not immediately turbid (absence of certain other resins).

Weigh 1 gramme, finely powdered, in a tared dry 100 millilitre flask, add 50 millilitres of freshly redistilled *ether*, shake vigorously for fifteen minutes, and allow to stand overnight; pour off the ether solution into a dry flask, wash the residue with 10 millilitres of freshly redistilled *ether*, and dry at 100°; the weight of the residue does not exceed 0·4 gramme (limit of ether-insoluble resins). To the ether solution and washings, obtained above, add 20 millilitres of *alcohol (95 per cent.)*, previously neutralised to *phenolphthalein*, and titrate with *N/10 sodium hydroxide*, using *solution of phenolphthalein* as indicator. Subtract the loss in weight of the scammony resin being tested, when dried at 100°, together with the weight of ether-insoluble resin from the 1 gramme of scammony resin taken, and calculate the *acid value* of the ether-soluble resins; the number so obtained does not exceed 30 (absence of colophony).

Loses, when dried at 100°, not more than 5 per cent. of its weight.

Leaves, on incineration, not more than 0·5 per cent. of residue.

DOSES

Metric.	**Imperial.**
0·03 to 0·2 gramme.	**$^1/_2$ to 3 grains.**

SCILLA

[Scill.]

Squill

Synonym. Scillæ bulbus I.A.

Squill is the bulb of *Urginea Scilla* Steinh., divested of its dry membranous outer scales, cut into slices, and dried.

Characters. Curved, very pale yellow, sometimes translucent, strips from 0·5 to 5 cm. long, frequently tapering towards both ends; tough and slightly flexible when moist, but brittle and easily powdered when dry. Epidermis mainly of subrectangular cells, some with thick striated cuticle; stomata, very rare; parenchyma of polyhedral thin-walled cells, most of which contain dextrose, while others contain bundles of acicular crystals of calcium oxalate embedded in mucilage which stains pink with *alkaline solution of corallin*; vascular strands with spiral and annular vessels; starch grains, very rare. Odour, slight; taste, bitter, mucilaginous and acrid.

Test for Purity. *Ash*, not more than 6 per cent.

Storage. Powdered Squill is very hygroscopic and should be kept quite dry in a desiccated atmosphere.

Preparations. Acetum Scillæ.
Syrupus Scillæ.
Oxymel Scillæ.
Tinctura Scillæ.

DOSES

Metric.	Imperial.
0·06 to 0·2 gramme.	1 to 3 grains.

SENEGA

[Seneg.]

Senega

Synonyms. Senegæ Radix: Senega Root.

Senega is the dried root of *Polygala Senega* Linn. It contains not more than 5 per cent. of stems and other organic matter.

Characters. Greyish or brownish-yellow, slender, usually from 5 to 20 centimetres long, with a knotty crown having numerous buds and bases of slender aerial stems, often purplish-pink; frequently curved or contorted, often with a longitudinal keel; sparingly branched; fracture, short. In transverse section, a horny translucent bark free from starch, and a whitish wood, often irregularly developed owing to the presence of one or more large wedges of parenchyma penetrating to the centre. Small globules of oil in all the parenchymatous tissues; starch, calcium oxalate, bast fibres and sclerenchymatous cells absent; medullary rays in the xylem, lignified and with small vessels, up to about 50 microns in diameter. Odour, characteristic; taste, sweet, afterwards acrid.

Preparations. Extractum Senegæ Liquidum.
Tinctura Senegæ.
Infusum Senegæ Concentratum.
Infusum Senegæ Recens.

DOSES

Metric.	Imperial.
0·4 to 0·8 gramme.	6 to 12 grains.

SENNÆ FOLIUM

[Senn. Fol.]

Senna Leaf

Senna Leaf consists of the dried leaflets of *Cassia acutifolia* Delile, known in commerce as Alexandrian senna, and of *Cassia angustifolia* Vahl, known in commerce as Tinnevelly senna. It contains not more than 1 per cent. of stalks, and not more than 2 per cent. of other organic matter.

Characters. Pale greyish-green or yellowish-green, thin, brittle; mostly 20 to 50 millimetres long and 5 to 16 millimetres wide; lanceolate or ovate-lanceolate; lamina, entire, acute, unequal at the base; veins on the under surface distinct; on both surfaces scattered hairs; isobilateral. Epidermal cells, in surface view, polygonal with straight walls, most of them containing mucilage; hairs, unicellular, thick walled, warty, frequently curved near the base; stomata on both surfaces; each stoma usually with two auxiliary cells having their long axes parallel to the pore; palisade, in a single row on each surface, that of the under surface with wavy walls; midrib, with a crescent-shaped group of sclerenchymatous fibres, cells containing prismatic crystals of calcium oxalate abutting on them; in the mesophyll, idioblasts containing cluster crystals. Odour, slight; taste, mucilaginous, slightly bitter, and characteristic.

Tests for Purity. *Ash*, not more than 12 per cent.; *acid-insoluble ash*, not more than 3 per cent.

Preparations. Confectio Sennæ.
Pulvis Glycyrrhizæ Compositus.

DOSES

Metric.	Imperial.
0·6 to 2 grammes.	10 to 30 grains.

SENNÆ FRUCTUS

[Senn. Fruct.]

Senna Fruit

Synonym. Senna Pod.

Senna Fruit consists of the dried ripe fruits of *Cassia acutifolia* Delile, known in commerce as Alexandrian senna pods, and of *Cassia angustifolia* Vahl, known in commerce as Tinnevelly senna pods. It contains not more than 2 per cent. of other organic matter.

Characters. Alexandrian Senna Fruit, pale green with a brown central area; flat and thin, broadly oblong or somewhat reniform; about 4 to 6 centimetres long and up to 2·5 centimetres wide; rounded at the apex, cuspidate at the base, sometimes ending in a short stalk. Pericarp, dry and membranous. Seeds, about 6, flattened, obovate-cuneate with a bluntly-pointed projection at the base. Odour and taste, slight.

Tinnevelly Senna Fruit differs in having more extensive brown central areas; length up to about 5 centimetres; width, up to 2 centimetres.

Preparations. Extractum Sennæ Liquidum.
Syrupus Sennæ.
Infusum Sennæ Concentratum.
Infusum Sennæ Recens.
Mistura Sennæ Composita.

DOSES

Metric.	Imperial.
0·6 to 2 grammes.	10 to 30 grains.

SERPENTARIA

[Serpent.]

Serpentary

Synonyms. Serpentariæ Rhizoma: Serpentary Rhizome.

Serpentary consists of the dried rhizome and roots of *Aristolochia reticulata* Nutt., and is known in commerce as Texan serpentary. It contains not more than 10 per cent. of its subaerial stems, and not more than 2 per cent. of other organic matter.

Characters. Rhizome, tortuous, about 1 to 2 centimetres long and about 2 millimetres thick; on the upper surface the remains of aerial stems up to about 2 millimetres in diameter; and on the under surface numerous wiry roots, often about 10 centimetres long and 0·2 to 1·2 millimetres thick; rhizome and roots, dull yellowish-brown. The characteristic microscopical features of the rhizome include abundant, yellow, reticulate vessels and tracheids in the wedge-shaped xylem bundles; in the pith, cortex and wide medullary rays, numerous starch grains, up to about 15 microns in diameter, most of the grains being simple, some compound with 2 to 4 components. Root, with conspicuous suberised endodermis and exodermis, and abundant starch in the parenchyma. Odour, characteristic and camphoraceous; taste, strong, camphoraceous and bitter.

Test for Purity. *Ash*, not more than 10 per cent.

Preparation. Tinctura Cinchonæ Composita.

DOSES

Metric.	Imperial.
0·05 to 0·1 gramme.	$^3/_4$ to $1^1/_2$ grains.

SERUM ANTIDYSENTERICUM (SHIGA)

[Serum Antidysenteric. (Shiga)]

Anti-dysentery Serum (Shiga)

CAUTION.—In any part of the British Empire in which Anti-dysentery Serum (Shiga) is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Anti-dysentery Serum (Shiga) is serum, or a preparation from serum, containing the immune substances, which have a specific therapeutic value, when injected into persons infected by *Bacillus dysenteriæ* (*Shiga*).

It is prepared by separating the serum from the blood of animals, which have been immunised by injection of cultures, or sterile filtrates from cultures, of the *Bacillus dysenteriæ* (*Shiga*). The serum may be used in the liquid form, or may be dried. The globulins, containing the specific immune substances, may be obtained from the serum by fractional precipitation, and the precipitate may be used either in solution, or dried. The final sterile product, whether serum, dried serum, solution of globulins, or dried globulins, is distributed in sterilised glass containers, which are sealed so as to exclude bacteria. An antiseptic may be added to the liquid forms.

Characters. The liquid serum is yellow or yellowish-brown. The solution of the globulins is yellowish-brown or greenish-yellow. Both liquid forms are initially transparent, but acquire with age a faint opalescence. They are almost odourless, except for the odour of any antiseptic which may have been added. The solid forms are yellowish-white powders, or yellow or yellowish-brown flakes. When dissolved in 10 parts of water, they resemble the liquid forms in colour and appearance. The liquid serum does not contain more than 10 per cent. w/v of solid matter. The solution of the globulins does not contain more than 20 per cent. w/v of solid matter. The solid forms do not contain antiseptic, or other added substance.

Test for Identity. It renders the toxic constituents of *Bacillus dysenteriæ* (*Shiga*) harmless to animals.

Tests for Purity. All forms comply with the *tests for sterility.* All forms comply with the *tests for freedom from abnormal toxicity.*

Assay. Determine the potency by the *biological assay of anti-dysentery serum* (*Shiga*), and express it in Units per millilitre for liquid preparations, and in Units per gramme for solid preparations.

Storage. Anti-dysentery Serum (Shiga) should be kept at as low a temperature as possible, above its freezing-point. The number of Units placed in each container must be sufficient to ensure that the number stated on the label is still present at the end of the period during which the preparation is intended to be used.

Labelling. The label or wrapper on the package, or the label on the container states:—(1) whether the product is serum, dried serum, solution of antitoxic globulins, or dried antitoxic globulins; (2) the date after which the preparation is not intended to be used.

The label on the container states:—(1) the minimum total number of Units in the container; (2) either (*a*) the number of Units in 1 millilitre, or in 1 gramme, or (*b*) the total number of millilitres of liquid, or grammes of dried product, in the container.

DOSES

By injection.

4000 to 10,000 Units.

SEVUM

[Sev.]

Suet

Synonyms. Sevum Præparatum : Prepared Suet.

Suet is the purified internal fat of the abdomen of the sheep, *Ovis aries* Linn.

Characters. Firm, white, unctuous fat; nearly odourless; taste, bland. Becomes rancid on prolonged exposure to air, and then must not be used.

Insoluble in *water*, and in cold *alcohol* (*90 per cent.*); soluble in 45 parts of boiling *alcohol* (*90 per cent.*), and in about 60 parts of *ether*.

Tests for Purity. *Melting-point*, between 45° and 50°; *refractive index* at 60°, 1·449 to 1·451; *acid value*, not more than 2·0; *saponification value*, 192 to 195; *iodine value*, 33 to 46.

SODII BENZOAS

[Sod. Benz.]

Sodium Benzoate

$C_6H_5{\cdot}COONa$ . . . Mol. Wt. 144·0

Sodium Benzoate may be obtained by neutralising benzoic acid with sodium carbonate. It contains not less than 99 per cent. of $C_7H_5O_2Na$, calculated with reference to the substance dried at 110°.

Characters. A white, amorphous, granular or crystalline, powder; odourless, or with a faint odour of benzoin; taste, unpleasant, sweetish and saline.

Soluble in about 2 parts of *water*; slightly soluble in *alcohol* (*90 per cent.*).

Tests for Identity. A 10 per cent. w/v aqueous solution yields with *test-solution of ferric chloride* a buff coloured precipitate, and with *dilute hydrochloric acid* a white crystalline precipitate of benzoic acid.

Yields the *reactions* characteristic of sodium.

Tests for Purity. 2 grammes, dissolved in 20 millilitres of hot freshly boiled *water*, requires for neutralisation not more than 0·5 millilitre of either *N/10 sodium hydroxide*, or *N/10 sulphuric acid*, *solution of phenolphthalein* being used as indicator (limit of acidity, or of alkalinity).

Dissolve 5 grammes in 10 millilitres of *water*, add 5 millilitres of *hydrochloric acid*, filter, and wash until the washings are free from chlorides; drain, and dry the precipitate; *melting-point* of the resulting benzoic acid, 121° to 122°.

Mix 0·5 gramme with 2 grammes of *anhydrous sodium carbonate* in a small crucible; invert in a larger crucible, and add 3 grammes of *anhydrous sodium carbonate* to cover the junction of the two crucibles; heat strongly and rapidly over a Bunsen flame, continue to heat for ten minutes, cool, dissolve the residue in 45 millilitres of *water* and 7 millilitres of *nitric acid*, and filter; to the filtrate add 1 millilitre of *solution of silver nitrate*; no more opalescence is produced than that given by adding 1 millilitre of *solution of silver nitrate* to a solution, prepared by dissolving 0·5 gramme of the sodium benzoate and 5 grammes of *sodium carbonate* in 40 millilitres of *water*, acidifying with 7 millilitres of *nitric acid*, filtering, adding 1 millilitre of *N/100 hydrochloric acid* and diluting to 50 millilitres with *water* (limit of chlorinated compounds).

Dissolve 1 gramme in 40 millilitres of *water*, add 1 millilitre of *nitric acid*, and filter; the filtrate complies with the *limit test for chlorides*.

Dissolve 1 gramme in 40 millilitres of *water*, add 1 millilitre of *hydrochloric acid*, and filter; the filtrate complies with the *limit test for sulphates*.

Arsenic limit, 2 parts per million. *Lead limit*, 10 parts per million.

Loses, when dried at 110°, not more than 4 per cent. of its weight.

Assay. Dissolve about 3 grammes, accurately weighed, in 50 millilitres of *water*, and neutralise the solution, if necessary, with *N/10 sulphuric acid*, using *solution of phenolphthalein* as indicator; add 50 millilitres of *ether* and a few drops of *solution of bromophenol blue*, and titrate with *N/2 sulphuric acid*, with constant shaking, until the colour of the indicator begins to change; separate the lower layer, wash the ethereal layer with 10 millilitres of *water*, and to the separated aqueous layer add the washings and a further 20 millilitres of *ether*; complete the titration with the *N/2 sulphuric acid*, shaking constantly. Each millilitre of *N/2 sulphuric acid* is equivalent to 0·07202 gramme of $C_7H_5O_2Na$.

DOSES

Metric.	Imperial.
0·3 to 2 grammes.	5 to 30 grains.

SODII BICARBONAS

[Sod. Bicarb.]

Sodium Bicarbonate

$NaHCO_3$ . . . . . Mol. Wt. 84·0

Sodium Bicarbonate may be obtained by the interaction of sodium chloride and ammonium bicarbonate. It contains not less than 99 per cent., and not more than the equivalent of 101 per cent., of $NaHCO_3$.

Characters. A white powder, or small, opaque, monoclinic crystals; odourless; taste, saline.

Soluble in 11 parts of *water*; insoluble in *alcohol* (*90 per cent.*).

Tests for Identity. Yields the *reactions* characteristic of sodium, and of bicarbonates.

Tests for Purity. Boil 10 grammes with 50 millilitres of *water* and 20 millilitres of *dilute solution of ammonia*, filter, and wash; the insoluble residue, after ignition, weighs not more than 0·001 gramme (limit of aluminium, calcium and insoluble matter).

1 gramme, warmed with 10 millilitres of *solution of sodium hydroxide*, does not evolve ammonia.

The *reaction* of a 1 per cent. w/v solution in *water* is not greater than *p*H 8·6, *thymol blue* being used as indicator.

2·5 grammes, dissolved in *water* with the addition of 2 millilitres of *nitric acid*, complies with the *limit test for chlorides.*

2·5 grammes, dissolved in *water* with the addition of 2·5 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates.*

2·5 grammes, dissolved in 25 millilitres of *dilute nitric acid FeT.*, complies with the *limit test for iron.*

Arsenic limit, 2 parts per million. *Lead limit*, 5 parts per million.

Assay. Dissolve about 1 gramme, accurately weighed, in 20 millilitres of *water*, and titrate with *N/2 sulphuric acid*, using *solution of methyl orange* as indicator. Each millilitre of *N/2 sulphuric acid* is equivalent to 0·042 gramme of $NaHCO_3$.

Sterilisation of a Solution. A solution of Sodium Bicarbonate for injection is sterilised by *Tyndallisation*, or by *filtration.*

DOSES

Metric.	Imperial.
1 to 4 grammes.	15 to 60 grains.

SODII BROMIDUM

[Sod. Brom.]

Sodium Bromide

$NaBr$ . . . . . . Mol. Wt. 102·9

Sodium Bromide may be obtained by the interaction of ferrous bromide and sodium carbonate. It contains not less than 99 per cent. of NaBr, calculated with reference to the substance dried at 110°.

Characters. Small, colourless, transparent or opaque, cubical crystals, or a white granular powder; odourless; taste, saline and slightly bitter. Deliquescent.

Soluble in about 1·5 parts of *water*, and in 16 parts of *alcohol (90 per cent.)*.

Tests for Identity. Yields the *reactions* characteristic of sodium, and of bromides.

Tests for Purity. Dissolve 1 gramme in 10 millilitres of freshly boiled and cooled *water*, and add 0·2 millilitre of *N/50 sulphuric acid*; no colour is produced on the addition of a drop of *solution of phenolphthalein* (limit of alkali).

Add 1 millilitre of *dilute sulphuric acid* to 1 gramme of the powdered salt; no yellow colour is immediately produced (limit of bromate).

Dissolve 0·5 gramme in 10 millilitres of *water*, and add 1 millilitre of *dilute sulphuric acid*; no turbidity is produced within five minutes (limit of barium).

Dissolve 1 gramme in 75 millilitres of *water* and 25 millilitres of *nitric acid*; expel the bromine by boiling for one minute, a rapid current of air being passed through the mixture while boiling and for twenty minutes during cooling; the residual liquid requires for complete precipitation not more than 1·7 millilitres of *N/10 silver nitrate* (limit of chlorides).

2 grammes complies with the *limit test for sulphates.*

0·5 gramme complies with the *limit test for iron.*

Arsenic limit, 2 parts per million. *Lead limit*, 10 parts per million.

Loses, when dried at 110°, not more than 5 per cent. of its weight.

Assay. Dissolve about 0·4 gramme, accurately weighed, in 40 millilitres of *water* and 5 millilitres of *nitric acid.* Add 50 millilitres of *N/10 silver nitrate*; titrate with *N/10 ammonium thiocyanate*, using *solution of ferric ammonium sulphate* as indicator, and correcting for the amount of chloride present, as determined by the test for limit of chlorides. Each millilitre of *N/10 silver nitrate* is equivalent to 0·01029 gramme of NaBr.

DOSES

Metric.	**Imperial.**
0·3 to 2 grammes.	**5 to 30 grains.**

SODII CARBONAS

[Sod. Carb.]

Sodium Carbonate

$Na_2CO_3,10H_2O$ . . . Mol. Wt. 286·15

Sodium Carbonate may be obtained by the action of heat on sodium bicarbonate, and subsequent crystallisation from water. It contains not less than 99 per cent., and not more than the equivalent of 102 per cent., of $Na_2CO_3,10H_2O$.

Characters. Transparent, colourless, rhombic crystals; odourless; taste, strongly alkaline. Efflorescent.

An aqueous solution is strongly alkaline to *litmus*.

Soluble in 2 parts of *water*; insoluble in *alcohol* (*90 per cent.*).

Tests for Identity. Yields the *reactions* characteristic of sodium, and of carbonates.

Tests for Purity. Boil 5 grammes with 50 millilitres of *water* and 10 millilitres of *dilute solution of ammonia*, filter, and wash; the insoluble residue, after ignition, weighs not more than 0·003 gramme (limit of aluminium, calcium, and insoluble matter).

0·5 gramme, dissolved in *water* with the addition of 2 millilitres of *nitric acid*, complies with the *limit test for chlorides*.

0·5 gramme, dissolved in *water* with the addition of 2 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates*.

2 grammes, dissolved in 15 millilitres of *dilute nitric acid FeT.*, complies with the *limit test for iron*.

Arsenic limit, 2 parts per million. *Lead limit*, 10 parts per million.

Assay. Dissolve about 2 grammes, accurately weighed, in 20 millilitres of *water*, and titrate with *N/2 sulphuric acid*, using *solution of methyl orange* as indicator. Each millilitre of *N/2 sulphuric acid* is equivalent to 0·07154 gramme of $Na_2CO_3,10H_2O$.

DOSES

Metric.	**Imperial.**
0·3 to 1 gramme.	**5 to 15 grains.**

SODII CARBONAS EXSICCATUS

[Sod. Carb. Exsic.]

Exsiccated Sodium Carbonate

Na_2CO_3. . . . . . Mol. Wt. 106·0

Exsiccated Sodium Carbonate may be obtained by the action of heat on sodium bicarbonate. It contains not less than 99·5 per cent. of Na_2CO_3, calculated with reference to the substance dried at 110°.

Characters. A white powder; odourless; taste, strongly alkaline. Readily soluble in *water.*

Tests for Identity. Yields the *reactions* characteristic of sodium, and of carbonates.

Tests for Purity. *Arsenic limit*, 5 parts per million. *Lead limit*, 25 parts per million.

Loses, when dried at 110°, not more than 2 per cent. of its weight.

Complies with the other Tests for Purity described under 'Sodii Carbonas', when half the stated quantity is taken for each test.

Assay. Dissolve about 1 gramme, accurately weighed, in 20 millilitres of *water*, and titrate with *N/2 sulphuric acid*, using *solution of methyl orange* as indicator. Each millilitre of *N/2 sulphuric acid* is equivalent to 0·0265 gramme of Na_2CO_3.

DOSES

Metric.	**Imperial.**
0·12 to 0·3 gramme.	**2 to 5 grains.**

SODII CHLORIDUM

[Sod. Chlorid.]

Sodium Chloride

NaCl . . . . . . Mol. Wt. 58·45

Sodium Chloride may be obtained by purifying common salt. It contains not less than 99·5 per cent. of NaCl, calculated with reference to the substance dried at 130°.

Characters. Colourless, transparent, cubical crystals, or a white crystalline powder; odourless; taste, saline.

Soluble in about 3 parts of *water*, and in about 10 parts of *glycerin.*

Tests for Identity. Yields the *reactions* characteristic of sodium, and of chlorides.

Tests for Purity. A 10 per cent. w/v solution in *water* is neutral to *litmus.*

Digest 2 grammes, finely powdered, for three hours with 25 millilitres of warm *alcohol* (*95 per cent.*), cool, and filter. Evaporate the filtrate to dryness, dissolve the residue in 5 millilitres of *water*, add 1 millilitre of *chloroform*, and then gradually drop by drop *solution of chlorine*, diluted with twice its volume of *water*; the chloroform does not acquire a violet, yellow or orange colour (absence of iodides, and of bromides).

Dissolve 0·5 gramme in 10 millilitres of *water*, and add 1 millilitre of *dilute sulphuric acid*; no turbidity is produced within five minutes (limit of barium).

1 gramme, dissolved in 20 millilitres of *water*, remains clear on the addition of 1 millilitre of *dilute solution of ammonia* and 1 millilitre of *solution of sodium phosphate* (limit of calcium, and of magnesium).

2 grammes complies with the *limit test for sulphates.*

1 gramme complies with the *limit test for iron.*

Arsenic limit, 1 part per million. *Lead limit*, 5 parts per million.

Loses, when dried at 130°, not more than 1 per cent. of its weight.

Assay. Dissolve about 0·25 gramme, accurately weighed, in about 50 millilitres of *water*, and titrate with *N/10 silver nitrate*, using *solution of potassium chromate* as indicator. Each millilitre of *N/10 silver nitrate* is equivalent to 0·005845 gramme of NaCl.

Sterilisation of a Solution. A solution of Sodium Chloride is sterilised by *heating in an autoclave*, or by *Tyndallisation*, or by *filtration.*

Preparations. Injectio Sodii Chloridi et Acaciæ.
Liquor Sodii Chloridi Physiologicus.

SODII CITRAS

[Sod. Cit.]

Sodium Citrate

$COONa{\cdot}C(OH)(CH_2{\cdot}COONa)_2,2H_2O$. Mol. Wt. 294·1

Sodium Citrate may be obtained by the interaction of citric acid and sodium carbonate. It contains not less than 99 per cent. of $C_6H_5O_7Na_3,2H_2O$.

Characters. White, granular crystals, or a crystalline powder; odourless; taste, saline. Slightly deliquescent in moist air, efflorescent in warm dry air.

Soluble in less than 2 parts of *water*; insoluble in *alcohol (90 per cent.)*.

Tests for Identity. Yields the *reactions* characteristic of sodium, and of citrates.

Tests for Purity. 2 grammes, dissolved in 25 millilitres of hot freshly boiled *water*, requires for neutralisation not more than

0·5 millilitre of either *N/10 sulphuric acid*, or *N/10 sodium hydroxide*, *solution of phenolphthalein* being used as indicator (limit of alkalinity, or of acidity).

2 grammes, heated in a boiling water-bath for one hour with 10 millilitres of *sulphuric acid*, does not acquire more than a pale yellow colour (limit of tartrates).

Dissolve 2 grammes in 20 millilitres of water, add 0·5 millilitre of *acetic acid* and 1 millilitre of *solution of calcium chloride*, and set aside for twenty-four hours; the solution remains clear (limit of oxalates).

1 gramme, dissolved in *water* with the addition of 2 millilitres of *nitric acid*, complies with the *limit test for chlorides*.

1 gramme, dissolved in *water* with the addition of 2 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates*.

Arsenic limit, 2 parts per million. *Lead limit*, 10 parts per million.

Assay. Heat, until carbonised, about 2 grammes, accurately weighed, cool, and boil the residue with 50 millilitres of *water* and 50 millilitres of *N/2 sulphuric acid*; filter, and wash the filter with *water*; titrate the excess of acid in the filtrate and washings with *N/2 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/2 sulphuric acid* is equivalent to 0·04901 gramme of $C_6H_5O_7Na_3,2H_2O$.

Storage. Sodium Citrate should be kept in a well-closed container.

Sterilisation of a Solution. A solution of Sodium Citrate for injection is sterilised by *heating in an autoclave*, or by *Tyndallisation*, or by *filtration*.

DOSES

Metric.	Imperial.
1 to 4 grammes.	15 to 60 grains.

SODII ET POTASSII TARTRAS

[Sod. et Pot. Tart.]

Sodium Potassium Tartrate

Synonyms. Potassii et Sodii Tartras: Rochelle Salt.

$COONa{\cdot}(CHOH)_2{\cdot}COOK,4H_2O$ Mol. Wt. 282·2

Sodium Potassium Tartrate may be obtained by neutralising potassium acid tartrate with sodium carbonate. It contains not less than 99 per cent., and not more than the equivalent of 104 per cent., of $C_4H_4O_6NaK,4H_2O$.

Characters. Colourless crystals, or a white crystalline powder; taste, saline and cooling.

Soluble in 1·5 parts of *water*, forming a clear colourless solution; almost insoluble in *alcohol* (*90 per cent.*).

Tests for Identity. Yields the *reactions* characteristic of sodium, of potassium, and of tartrates.

Tests for Purity. Dissolve 1 gramme in 10 millilitres of recently boiled and cooled *water*; the solution is not alkaline to *phenolphthalein*, and requires not more than 0·1 millilitre of *N/10 sodium hydroxide* to produce a pink colour (limit of alkalinity, and of acidity).

0·5 gramme complies with the *limit test for chlorides*, with the *limit test for sulphates*, and with the *limit test for iron*.

Arsenic limit, 2 parts per million. *Lead limit*, 20 parts per million.

Assay. Heat, until carbonised, about 2 grammes, accurately weighed, cool, and boil the residue with 50 millilitres of *water* and 50 millilitres of *N/2 sulphuric acid*; filter, and wash the filter with *water*; titrate the excess of acid in the filtrate and washings with *N/2 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/2 sulphuric acid* is equivalent to 0·07055 gramme of $C_4H_4O_6NaK,4H_2O$.

Preparation. Pulvis Effervescens Compositus.

DOSES

Metric.	Imperial.
8 to 16 grammes.	120 to 240 grains.

SODII HYDROXIDUM

[Sod. Hydrox.]

Sodium Hydroxide

NaOH . . . . . . Mol. Wt. 40·00

Sodium Hydroxide may be obtained by the electrolysis of an aqueous solution of sodium chloride. It contains not less than 95 per cent. of total alkali, calculated as NaOH.

Characters. White sticks, fused masses or scales; dry, hard, brittle, and showing a crystalline fracture. Very deliquescent; strongly alkaline and corrosive. Rapidly absorbs carbon dioxide.

Soluble in 1 part of *water*; very soluble in *alcohol* (*90 per cent.*).

Test for Identity. Yields the *reaction* characteristic of sodium.

Tests for Purity. Dissolve 5 grammes in 100 millilitres of boiling *alcohol* (*90 per cent.*), previously neutralised to *phenolphthalein*, filter while hot, and wash the filter thoroughly with boiling neutralised *alcohol* (*90 per cent.*); the residue dissolved in *water* requires for neutralisation not more than 12 millilitres of *N/5 sulphuric acid*, *solution of methyl orange* being used as indicator (limit of carbonate).

Boil 5 grammes with 50 millilitres of *dilute hydrochloric acid*, cool, make alkaline with *dilute solution of ammonia*, filter, and wash; the insoluble residue, after ignition, weighs not more than 0·005 gramme (limit of aluminium, iron and matter insoluble in hydrochloric acid).

Arsenic limit, 5 parts per million. *Lead limit*, 5 parts per million.

Assay. Dissolve about 1 gramme, accurately weighed, in 25 millilitres of *water*, and titrate with *N/1 sulphuric acid*, using *solution of methyl orange* as indicator. Each millilitre of *N/1 sulphuric acid* is equivalent to 0·0400 gramme of total alkali, calculated as NaOH.

Storage. Sodium Hydroxide should be kept in a well-closed container.

SODII IODIDUM

[Sod. Iod.]

Sodium Iodide

NaI . . . . . . Mol. Wt. 149·9

Sodium Iodide may be prepared from iodine and a solution of sodium hydroxide by a process similar to that employed for the preparation of Potassium Iodide, the salt being crystallised at a temperature not below 20°. It contains not less than 99 per cent. of NaI, calculated with reference to the substance dried at 110°.

Characters. A white, crystalline powder; odourless; taste, saline and slightly bitter. Deliquescent in moist air.

Soluble in less than 1 part of *water*, and in 3 parts of *alcohol* (*90 per cent.*).

Tests for Identity. Yields the *reactions* characteristic of sodium, and of iodides.

Tests for Purity. Dissolve 1 gramme in 10 millilitres of freshly boiled and cooled *water*, and add 0·2 millilitre of *N/50 sulphuric* *acid*; no colour is produced on the addition of a drop of *solution of phenolphthalein* (limit of alkali).

Dissolve 0·5 gramme in 10 millilitres of freshly boiled and cooled *water*, and add 2 drops of *dilute sulphuric acid* followed by a drop of *mucilage of starch*; no blue colour is produced immediately (limit of iodate).

Dissolve 0·5 gramme in 10 millilitres of *water*, and add 1 millilitre of *dilute sulphuric acid*; no turbidity is produced within five minutes (absence of barium).

Dissolve 0·5 gramme in 5 millilitres of warm *water*, add 1 drop of *solution of ferrous sulphate* and 0·5 millilitre of *solution of sodium hydroxide*, and acidify with *hydrochloric acid*: no blue colour is produced (limit of cyanide).

2 grammes complies with the *limit test for sulphates*.

Arsenic limit, 2 parts per million. *Lead limit*, 10 parts per million.

Loses, when dried at 110°, not more than 5 per cent. of its weight.

Assay. Dissolve about 0·5 gramme, accurately weighed, in 10 millilitres of *water*, and carry out the Assay as directed under 'Potassii Iodidum'. Each millilitre of *M/20 potassium iodate* is equivalent to 0·01499 gramme of NaI.

DOSES

Metric.	Imperial.
0·3 to 2 grammes.	5 to 30 grains.

SODII NITRIS

[Sod. Nitris]

Sodium Nitrite

$NaNO_2$ . . . . . Mol. Wt. 69·005

Sodium Nitrite may be obtained by reducing sodium nitrate with metallic lead. It contains not less than 95 per cent. of $NaNO_2$.

Characters. Colourless, or slightly yellow, crystals, or a white, or slightly yellow, granular powder; taste, saline. Deliquescent.

Soluble in about 1·5 parts of *water*; sparingly soluble in *alcohol (90 per cent.)*.

Tests for Identity. Yields the *reactions* characteristic of sodium, and of nitrites.

Tests for Purity. 0·5 gramme complies with the *limit test for chlorides*, and with the *limit test for sulphates*.

Arsenic limit, 5 parts per million. *Lead limit*, 20 parts per million.

Assay. Dissolve about 0·5 gramme, accurately weighed, in sufficient *water* to produce 100 millilitres, and determine by titration the volume of the solution required to decolourise a mixture of 50 millilitres of *N/10 potassium permanganate*, 5 millilitres of *sulphuric acid*, and 100 millilitres of *water*, warmed to about 40°. Each millilitre of *N/10 potassium permanganate* is equivalent to 0·00345 gramme of $NaNO_2$.

Storage. Sodium nitrite should be kept in a well-closed container.

DOSES

Metric.	Imperial.
0·03 to 0·12 gramme.	**$^1/_2$ to 2 grains.**

SODII PHOSPHAS

[Sod. Phosph.]

Sodium Phosphate

Synonym. Di-sodium Hydrogen Phosphate.

$Na_2HPO_4,12H_2O$ . . . Mol. Wt. 358·2

Sodium Phosphate may be prepared by the interaction of sodium carbonate and acid calcium phosphate. It contains not less than 99 per cent., and not more than the equivalent of 105 per cent., of $Na_2HPO_4,12H_2O$.

Characters. Colourless crystals; odourless; taste, saline. Efflorescent in dry air.

Soluble in 7 parts of *water*; almost insoluble in *alcohol (90 per cent.)*.

Tests for Identity. A 10 per cent. w/v solution in *water* is alkaline to *litmus*.

Yields the *reactions* characteristic of sodium, and of phosphates.

Tests for Purity. Dissolve 2 grammes in 50 millilitres of *water*, add 3 millilitres of *dilute solution of ammonia*, and set aside for five minutes; no turbidity is produced (limit of calcium, and of magnesium).

1 gramme, dissolved in *water* with the addition of 2 millilitres of *nitric acid*, complies with the *limit test for chlorides*.

0·4 gramme, dissolved in *water* with the addition of 1·5 millilitres of *hydrochloric acid*, complies with the *limit test for sulphates*.

Arsenic limit, 5 parts per million. *Lead limit*, 5 parts per million.

Assay. Dissolve about 6 grammes, accurately weighed, in 100 millilitres of *water*, and titrate with *N/2 sulphuric acid*, using *solution of bromocresol green* as indicator, and titrating to the green colour indicative of *p*H 4·5. Each millilitre of *N/2 sulphuric acid* is equivalent to 0·1791 gramme of $Na_2HPO_4,12H_2O$.

Preparation. Sodii Phosphas Effervescens.

DOSES

Metric.	Imperial.
2 to 16 grammes.	30 to 240 grains.

SODII PHOSPHAS ACIDUS

[Sod. Phosph. Acid.]

Sodium Acid Phosphate

Synonym. Sodium Di-hydrogen Phosphate.

$NaH_2PO_4,2H_2O$ . . . Mol. Wt. 156·1

Sodium Acid Phosphate may be prepared by the combination of sodium phosphate with phosphoric acid. It contains not less than 98 per cent. of $NaH_2PO_4,2H_2O$.

Characters. Colourless crystals, or a crystalline powder; odourless; taste, acid and saline.

Soluble in about 1 part of *water*.

Tests for Identity. A 10 per cent. w/v solution in *water* is acid to *litmus*.

Yields the *reactions* characteristic of sodium, and of phosphates.

Tests for Purity. 1 gramme, dissolved in 50 millilitres of *water*, requires for neutralisation, to the green colour of *bromocresol green* indicative of *p*H 4·5, not more than 1 millilitre of *N/10 sulphuric acid* (limit of di-sodium phosphate).

Dissolve 2 grammes in 50 millilitres of *water*, add 3 millilitres of *dilute solution of ammonia*, and set aside for five minutes; no turbidity is produced (limit of calcium, and of magnesium).

1 gramme complies with the *limit test for chlorides*.

0·5 gramme complies with the *limit test for sulphates*.

Arsenic limit, 5 parts per million. *Lead limit*, 5 parts per million.

Assay. Dissolve about 3 grammes, accurately weighed, in 100 millilitres of *water*, add 25 grammes of *sodium chloride*, and titrate with *N/2 sodium hydroxide*, using *solution of phenolphthalein* as indicator. Each millilitre of *N/2 sodium hydroxide* is equivalent to 0·07803 gramme of $NaH_2PO_4,2H_2O$.

DOSES

Metric.	**Imperial.**
2 to 4 grammes.	**30 to 60 grains.**

SODII PHOSPHAS EFFERVESCENS

[Sod. Phosph. Efferv.]

Effervescent Sodium Phosphate

Sodium Phosphate . . .	500 grammes
Sodium Bicarbonate, finely powdered	500 grammes
Tartaric Acid, finely powdered .	240 grammes
Citric Acid, finely powdered .	210 grammes

Dry the Sodium Phosphate until it has lost about 60 per cent. of its weight; powder the dried salt, and mix it with the other ingredients. Place the whole in a dish or pan of suitable form, heated to between 95° and 105°. When the mixture, by aid of careful manipulation at this temperature, has assumed a granular character, separate it into granules of uniform and convenient size by means of suitable sieves. Dry the granules at a temperature not exceeding 55°. The product weighs about 1000 grammes.

Storage. Effervescent Sodium Phosphate should be kept in a well-closed container.

DOSES

Metric.	**Imperial.**
4 to 16 grammes.	**60 to 240 grains.**

SODII SALICYLAS

[Sod. Salicyl.]

Sodium Salicylate

$C_6H_4(OH)\cdot COONa$ . . . Mol. Wt. 160·0

Sodium Salicylate may be prepared by the interaction of salicylic acid and sodium carbonate. It contains not less

than 99·5 per cent. of $C_7H_5O_3Na$, calculated with reference to the substance dried at 110°.

Characters. Colourless, small crystals or crystalline flakes, or a white powder; odourless, or with a faint characteristic odour; taste, sweetish, saline, and unpleasant.

Soluble in 1 part of *water*, but this solution is liable to deposit crystals of the hexahydrate, $NaC_7H_5O_3,6H_2O$; soluble in about 6 parts of *alcohol (90 per cent.)*.

Tests for Identity. A 1 per cent. w/v aqueous solution yields with *test-solution of ferric chloride* an intense violet colour.

Yields the *reactions* characteristic of sodium.

Tests for Purity. 2 grammes, dissolved in 50 millilitres of freshly boiled and cooled *water*, is not coloured red by the addition of 10 drops of *solution of phenol red*, and requires not more than 0·2 millilitre of *N/10 sodium hydroxide* to produce a red colour (absence of free alkali, and limit of free acid).

Dissolve 5 grammes in 10 millilitres of *water*, add 5 millilitres of *hydrochloric acid*, filter, and wash until the washings are free from chlorides; drain, and dry the precipitate; *melting-point* of the resulting salicylic acid, 158° to 159°.

Dissolve 1 gramme in 40 millilitres of *water*, add 1 millilitre of *nitric acid*, and filter; the filtrate complies with the *limit test for chlorides.*

Dissolve 1 gramme in 40 millilitres of *water*, add 1 millilitre of *hydrochloric acid*, and filter; the filtrate complies with the *limit test for sulphates.*

Arsenic limit, 2 parts per million. *Lead limit*, 10 parts per million.

Loses, when dried at 110°, not more than 1 per cent. of its weight.

Assay. Dissolve about 3 grammes, accurately weighed, in 50 millilitres of *water*, add 50 millilitres of *ether* and a few drops of *solution of bromophenol blue*, and titrate with *N/2 sulphuric acid*, with constant shaking, until the colour of the indicator begins to change; separate the lower layer, wash the ethereal layer with 10 millilitres of *water*, and to the separated aqueous layer add the washings and a further 20 millilitres of *ether*; complete the titration with the *N/2 sulphuric acid*, shaking constantly. Each millilitre of *N/2 sulphuric acid* is equivalent to 0·0800 gramme of $C_7H_5O_3Na$.

Sterilisation of a Solution. A solution of Sodium Salicylate for injection is sterilised by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass.*

DOSES

Metric.	Imperial.
0·6 to 2 grammes.	10 to 30 grains.

SODII SULPHAS

[Sod. Sulph.]

Sodium Sulphate

Synonym. Glauber's Salt.

$Na_2SO_4,10H_2O$. . . . Mol. Wt. 322·2

Sodium Sulphate may be obtained by the interaction of sodium chloride and sulphuric acid. It contains not less than 99 per cent., and not more than the equivalent of 102 per cent., of $Na_2SO_4,10H_2O$.

Characters. Colourless crystals; odourless; taste, bitter and saline. Efflorescent in dry air.

Soluble in about 3 parts of *water*; insoluble in *alcohol (90 per cent.)*.

Tests for Identity. Yields the *reactions* characteristic of sodium, and of sulphates.

Tests for Purity. 10 grammes, dissolved in 100 millilitres of recently boiled and cooled *water*, requires for neutralisation, to the green colour of *bromothymol blue* indicative of *p*H 7, not more than 0·5 millilitre of either *N/10 sodium hydroxide*, or *N/10 sulphuric acid* (limit of acidity, or of alkalinity).

Dissolve 2 grammes in 20 millilitres of *water*, acidify with 1 millilitre of *acetic acid*, and add a few drops of *solution of potassium ferrocyanide*; no turbidity or blue colour is produced (limit of iron, and of zinc).

Dissolve 2 grammes in 20 millilitres of *water*, add 1 millilitre of *dilute solution of ammonia* and 1 millilitre of *solution of sodium phosphate*, and set aside for five minutes; no turbidity is produced (limit of magnesium).

1 gramme complies with the *limit test for chlorides.*

Arsenic limit, 2 parts per million. *Lead limit*, 5 parts per million.

Loses, when dried at 100°, not less than 55 per cent., and not more than 56·35 per cent., of its weight.

Assay. Dissolve about 0·5 gramme, accurately weighed, in 100 millilitres of *water*, add 1 millilitre of *hydrochloric acid*, heat to boiling, add slowly a slight excess of hot *solution of barium chloride*, and heat for half an hour on a water-bath; collect the precipitate, wash, ignite, and weigh. 1 gramme of the precipitate is equivalent to 1·38 grammes of $Na_2SO_4,10H_2O$.

Preparation. Sodii Sulphas Effervescens.

DOSES

Metric.	Imperial.
2 to 16 grammes.	30 to 240 grains.

SODII SULPHAS EFFERVESCENS

[Sod. Sulph. Efferv.]

Effervescent Sodium Sulphate

Sodium Sulphate	500 grammes
Sodium Bicarbonate, finely powdered	500 grammes
Tartaric Acid, finely powdered .	240 grammes
Citric Acid, finely powdered .	210 grammes

Dry the Sodium Sulphate until it has lost about 55 per cent. of its weight; powder the dried salt, and mix it with the other ingredients. Place the whole in a dish or pan of suitable form, heated to between 95° and 105°. When the mixture, by aid of careful manipulation at this temperature, has assumed a granular character, separate it into granules of uniform and convenient size by means of suitable sieves. Dry the granules at a temperature not exceeding 55°. The product weighs about 1000 grammes.

Storage. Effervescent Sodium Sulphate should be kept in a well-closed container.

DOSES

Metric.	**Imperial.**
4 to 16 grammes.	**60 to 240 grains.**

SPIRITUS ÆTHERIS

[Sp. Æther.]

Spirit of Ether

Ether	330 millilitres
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Mix.

Test for Purity. *Specific gravity* (15·5°/15·5°), 0·802 to 0·806. *Alcohol content*, 59 to 65 per cent. v/v of ethyl alcohol.

Preparation. Tinctura Lobeliæ Ætherea.

DOSES

Metric.	**Imperial.**
1 to 4 mils.	**15 to 60 minims.**

SPIRITUS ÆTHERIS NITROSI

[Sp. Æther. Nitros.]

Spirit of Nitrous Ether

Synonym. Sweet Spirit of Nitre.

Spirit of Nitrous Ether is an alcoholic solution, containing not less than 1·25 per cent. w/v, and not more than 2·5 per cent. w/v, of ethyl nitrite, together with acetaldehyde and other related substances. It may be prepared by distilling a mixture of Alcohol (90 per cent.), Sulphuric Acid, and Nitric Acid, with copper, and collecting the distillate in a receiver containing Alcohol (90 per cent.).

Characters. A transparent, faintly yellow liquid; odour, characteristic, penetrating and apple-like; taste, characteristic.

Test for Identity. Pour 5 millilitres on to the surface of 5 millilitres of a strong aqueous solution of *ferrous sulphate*, acidified with *sulphuric acid*; a deep olive-brown colour is produced at the zone of contact.

Tests for Purity. *Specific gravity* (15·5°/15·5°), 0·838 to 0·842.

2 millilitres, diluted to 10 millilitres with *water*, gives no pink colour on the addition of five drops of *solution of thymol blue* (limit of acid).

Assay. Introduce 2 millilitres into a brine-charged nitrometer together with 2 millilitres of *solution of potassium iodide* and 2 millilitres of *dilute sulphuric acid*, shake briskly at intervals for five minutes, and measure the volume of nitric oxide produced. Each millilitre of moist nitric oxide, at 15·5° and normal pressure, is equivalent to 0·0032 gramme of $C_2H_5O_2N$.

Alcohol content, 84 to 88 per cent. v/v of ethyl alcohol.

Storage. Spirit of Nitrous Ether should be kept in a small well-closed container, protected from light, and stored in a cool place.

DOSES

Metric.	Imperial.
1 to 4 mils.	15 to 60 minims.

SPIRITUS AMMONIÆ AROMATICUS

[Sp. Ammon. Aromat.]

Aromatic Spirit of Ammonia

Synonym. Spirit of Sal Volatile.

Aromatic Spirit of Ammonia contains ammonia and ammonium carbonate, together equivalent to not less than

2·1 per cent. w/v, and not more than 2·4 per cent. w/v, of NH_3; and not less than 1·265 per cent. w/v, and not more than 1·485 per cent. w/v, of CO_2.

Ammonium Carbonate . .	25 grammes
Strong Solution of Ammonia .	50 millilitres
Oil of Lemon	5 millilitres
Oil of Nutmeg	3 millilitres
Alcohol (90 per cent.) . .	750 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Place the Oil of Lemon, Oil of Nutmeg and Alcohol (90 per cent.) with 375 millilitres of Distilled Water in a still; distil 875 millilitres; then distil and separately collect an additional 55 millilitres. Place the latter, together with the Ammonium Carbonate and the Strong Solution of Ammonia, in a bottle of rather more than 120 millilitres capacity; securely close the bottle, and gently warm it in a water-bath to 60°, shaking from time to time until all the salt has dissolved. Filter the resulting solution, when cold, through cotton wool, and gradually mix the filtrate with the portion first distilled. Add sufficient Distilled Water to produce the required volume.

Characters. A nearly colourless, transparent liquid; odour and taste, pungent, aromatic and ammoniacal.

Specific gravity (15·5°/15·5°), 0·890 to 0·900.

Assay. *For ammonia.* To 20 millilitres add 50 millilitres of *N/1 sulphuric acid*, boil, cool, and titrate with *N/1 sodium hydroxide*, using *solution of methyl red* as indicator; each millilitre of *N/1 sulphuric acid* is equivalent to 0·0170 gramme of NH_3.

For carbonate. Mix 20 millilitres with 50 millilitres of *water* and 50 millilitres of *solution of barium chloride*, heat the mixture to 70°, and set aside in a closed flask for three hours, shaking occasionally; collect the precipitate, wash it with 100 millilitres of recently boiled and cooled *water*, and dissolve in 20 millilitres of *N/1 hydrochloric acid*; boil, cool the solution, and titrate with *N/1 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/1 hydrochloric acid* is equivalent to 0·0220 gramme of CO_2.

Alcohol content, 65 to 70 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
1 to 4 mils.	15 to 60 minims.

SPIRITUS CAJUPUTI

[Sp. Cajuput.]

Spirit of Cajuput

Oil of Cajuput	100 millilitres
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Dissolve. If the solution is not clear, shake with *powdered talc*, and filter.

Alcohol content, 80 to 82 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
0·3 to 2 mils.	**5 to 30 minims.**

SPIRITUS CAMPHORÆ

[Sp. Camph.]

Spirit of Camphor

Camphor	100 grammes
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Dissolve.

Specific gravity (15·5°/15·5°), 0·845 to 0·849.

Alcohol content, 80 to 82 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
0·3 to 2 mils.	**5 to 30 minims.**

SPIRITUS CHLOROFORMI

[Sp. Chlorof.]

Spirit of Chloroform

Chloroform	50 millilitres
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Dissolve.

Specific gravity (15·5°/15·5°), 0·863 to 0·867.
Alcohol content, 84 to 87 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
0·3 to 2 mils.	5 to 30 minims.

SPIRITUS MENTHÆ PIPERITÆ

[Sp. Menth. Pip.]

Spirit of Peppermint

Synonym. Essence of Peppermint.

Oil of Peppermint . . .	100 millilitres
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Dissolve. If the solution is not clear, shake with *powdered talc*, and filter.

Alcohol content, 80 to 82 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
0·3 to 2 mils.	5 to 30 minims.

SPIRITUS METHYLATUS INDUSTRIALIS

[Sp. Meth. Indust.]

Industrial Methylated Spirit

Synonym. Industrial Methylated Spirits.

Industrial Methylated Spirit is a mixture, made by a legally authorised methylator, of 19 volumes of Alcohol (95 per cent.) with 1 volume of approved wood naphtha, and is of the quality known as '66 O.P. Industrial Methylated Spirits'.

Characters. Similar to those of *alcohol (95 per cent.)*, but having in addition the odour of wood naphtha.

Tests for Identity and Purity. *Specific gravity* (15·5°/15·5°), not greater than 0·817.

20 millilitres requires not more than 0·2 millilitre of *N/10 sodium hydroxide* to give a pink colour with *phenolphthalein* (limit of acidity).

20 millilitres requires not more than 1·0 millilitre of *N/10 sulphuric acid* to give a red colour with *methyl red* (limit of alkalinity).

When mixed with *water* in any proportion, the solution remains clear (limit of oily or resinous substances).

0·5 millilitre, diluted with *water* to 5 millilitres and tested for methyl alcohol as described under 'Alcohol', gives a deep violet colour.

Leaves, on evaporation and drying at 100°, not more than 0·01 per cent. w/v of residue.

STRAMONIUM

[Stramon.]

Stramonium

Synonyms. Stramonii Folia : Stramonium Leaves.

Stramonium consists of the dried leaves and flowering tops of *Datura Stramonium* Linn., and of *D. tatula* Linn. It contains not more than 2 per cent. of other organic matter, not more than 20 per cent. of its stem, not more than 1 per cent. of its stem having a width greater than 4 millimetres, and not less than 0·25 per cent. of the alkaloids of stramonium, calculated as hyoscyamine.

Characters. Leaves, dark greyish-green, thin and brittle ; mostly from 8 to 25 centimetres long, and from 7 to 20 centimetres wide ; ovate or triangular-ovate, shortly petiolate, often unequal at the base ; margin sinuate-dentate ; apex, acuminate ; often much twisted and shrunken during drying. Flowers, solitary, arising at points where the stem forks, about 7·5 centimetres long, erect upon a short pedicel ; corolla, white or purple, plicate, funnel-shaped ; ovary, superior, conical bilocular, covered with short, stiff emergences. Cells of both upper and lower leaf-epidermis with a smooth cuticle, and, in surface view, wavy walls ; on both surfaces stomata of solanaceous type and, especially on the younger leaves, scattered hairs, mostly three-celled, slightly curved, with thin warty walls, the basal cell being usually more than 50 microns long and 35 microns in diameter at the base, and also small glandular hairs with a one or two-celled pedicel ; in the mesophyll, numerous idioblasts with cluster crystals of calcium oxalate, and occasionally with microsphenoidal crystals or single or twin prismatic crystals; in the midrib, groups of perimedullary phloem. Stems, with epidermal hairs reaching a length of 800 microns, occasional pericyclic and numerous wood fibres, and a pith with perimedullary phloem and crystal idioblasts similar to those of the leaf. Odour, unpleasant; taste, bitter.

Tests for Purity. *Ash*, not more than 20 per cent.; *acid-insoluble ash*, not more than 4 per cent.

Assay. Carry out the Assay described under 'Belladonnæ Folium'. Each millilitre of *N/50 sulphuric acid* is equivalent to 0·005784 gramme of hyoscyamine.

Storage. Stramonium should be stored in a dry place.

Preparation. Tinctura Stramonii.

DOSES

Metric.	**Imperial.**
0·03 to 0·2 gramme.	**$^1/_2$ to 3 grains.**

Stramonium contains in 0·2 gramme 0·0005 gramme, and in 3 grains about $^1/_{120}$ grain, of alkaloids, calculated as hyoscyamine.

STROPHANTHINUM

[Strophanthin.]

Strophanthin

Synonyms. Kombé Strophanthin : K-Strophanthin.

Strophanthin is a mixture of glucosides, obtained from Strophanthus; when undiluted, it has the characters and complies with the tests described below. It is diluted, if necessary, with powdered Lactose so as to possess an activity which is 40 per cent. of that of anhydrous ouabain; but, when so diluted, allowance must be made for alterations due to the presence of Lactose.

Characters. A white, or yellowish-white, powder in which minute crystals may be visible under the microscope.

Moderately soluble in *water*, and in *alcohol* (*90 per cent.*); less soluble in *dehydrated alcohol*; almost insoluble in *ether*; very sparingly soluble in *chloroform*; almost insoluble in *benzene*, and in *light petroleum* (*boiling-point, 50° to 60°*).

A solution in *water*, or in *alcohol* (*90 per cent.*), is neutral to *litmus*, and is dextrorotatory.

Test for Identity. Dissolves in a cold mixture of 4 volumes of *sulphuric acid* with 1 volume of *water*, producing immediately an emerald-green colour (distinction from ouabain).

Tests for Purity. 0·2 gramme loses, when dried in a vacuum desiccator over *sulphuric acid*, not more than 0·006 gramme; and leaves, on incineration, not more than 0·002 gramme of residue.

Assay. Determine the activity by the *biological assay of strophanthin.*

Storage. Strophanthin should be kept in a well-closed container, protected from light.

Sterilisation of a Solution. A solution of Strophanthin for injection is prepared by aseptic methods and transferred to previously sterilised containers, which are sealed so as to exclude bacteria. The solution is then heated to 80° for one hour. A solution, so prepared, is used within twenty-four hours.

DOSES

Metric.	Imperial.
By intramuscular or intravenous injection.	
0·00025 to 0·001 gramme.	$^1/_{240}$ to $^1/_{60}$ grain.

STROPHANTHUS

[Strophanth.]

Strophanthus

Synonyms. Strophanthi Semina : Strophanthus Seeds.

Strophanthus consists of the dried ripe seeds of *Strophanthus kombé* Oliver, freed from the awns. It contains not more than 2 per cent. of other organic matter.

Characters. Lanceolate to linear-lanceolate, acuminate, about 12 to 18 millimetres long and 3 to 5 millimetres broad, flattened, obtuse at the base; covered with longitudinal rows of silky appressed hairs directed towards the apex; on the ventral side, a longitudinal ridge running from the centre to the apex; colour, greyish-green to greenish-fawn; kernel, white and oily; cotyledons, straight; endosperm, narrow. Epidermis of testa composed of elongated polygonal cells with straight, thickened and lignified side walls, many extended to form hairs with a longitudinal lignified rib, and band-shaped thickening at the base; in the testa, scattered cluster crystals and an occasional single crystal of calcium oxalate. Odour, characteristic; taste, very bitter.

Tests for Purity. *Sulphuric acid*, diluted with one third of its volume of *water*, colours the endosperm, and sometimes the cotyledons, deep green.

Ash, not more than 5 per cent.

Preparation. Tinctura Strophanthi.

STRYCHNINÆ HYDROCHLORIDUM

[Strych. Hydrochlor.]

Strychnine Hydrochloride

$C_{21}H_{22}O_2N_2,HCl,2H_2O$ . . Mol. Wt. 406·7

Strychnine Hydrochloride is the hydrochloride of an alkaloid, strychnine, obtained from the seeds of *Strychnos Nux-vomica* Linn., and of other species of *Strychnos*.

Characters. Colourless, prismatic crystals; taste, intensely bitter. Crystallises from aqueous solution with a slightly variable proportion of water of crystallisation.

Soluble in about 40 parts of *water*, and in about 80 parts of *alcohol* (*90 per cent.*).

A 2 per cent. w/v aqueous solution is neutral to *litmus*.

Tests for Identity. Dissolve a small fragment in 2 or 3 drops of *sulphuric acid* on a white porcelain plate, and slowly move a small crystal of *potassium dichromate* through the solution; an intense violet colour is produced, passing through red to yellow.

Moisten a few fragments with 3 drops of *sulphuric acid*, add about 0·05 gm. of *ammonium vanadate*, and stir the mixture well; a deep violet colour is produced, which after a few minutes changes to red; on dilution with *water* the liquid assumes a cherry-red colour.

Yields the *reactions* characteristic of chlorides.

Tests for Purity. To 0·1 gramme add 1 millilitre of a mixture of equal volumes of *nitric acid* and of *water*; no red, or reddish, colour is produced (limit of brucine).

To a solution of 0·2 gramme in 5 millilitres of hot *water* add 0·5 millilitre of *solution of barium chloride*, and boil; the liquid remains clear (limit of sulphate).

Dissolve 0·1 gramme in 2 millilitres of *sulphuric acid*; not more than a faint yellow colour is produced (limit of readily carbonisable substances).

0·2 gramme loses, when dried at 110°, not less than 0·014 gramme, and not more than 0·018 gramme; and leaves, on incineration, not more than 0·0002 gramme of residue.

Sterilisation of a Solution. A solution of Strychnine Hydrochloride for injection is sterilised by *heating in an autoclave*, or by *Tyndallisation*, or by *filtration*. The containers comply with the *tests for limit of alkalinity of glass*.

Preparations. Liquor Strychninæ Hydrochloridi.
Syrupus Ferri Phosphatis cum Quinina et Strychnina.

DOSES

Metric.	**Imperial.**
0·002 to 0·008 gramme.	**$^1/_{32}$ to $^1/_8$ grain.**

STYRAX

[Styr.]

Storax

Synonyms. Styrax Præparatus: Prepared Storax.

Storax is a balsam, obtained from the wounded trunk of *Liquidambar orientalis* Mill., purified by solution in alcohol, filtration, and subsequent evaporation of the solvent. It contains not less than 30 per cent. of total balsamic acids, calculated with reference to the substance dried on a water-bath for one hour.

Characters. A brown, viscous substance, transparent in thin layers; odour and taste, agreeable and balsamic.

Entirely soluble in *alcohol (90 per cent.)*, and in *ether*.

Test for Identity. Boiled with *solution of potassium chromate* and *sulphuric acid*, it emits an odour of benzaldehyde.

Tests for Purity. *Acid value*, 55 to 90; *ester value*, 100 to 133; *saponification value*, 170 to 200; all being calculated with reference to the substance dried on a water-bath for one hour.

Loses, when heated in a thin layer on a water-bath for one hour, not more than 5 per cent. of its weight.

Assay. Carry out the method for the *determination of total balsamic acids*.

DOSES

Metric.	**Imperial.**
0·6 to 2 grammes.	**10 to 30 grains.**

In making Storax the alcohol may be replaced by Industrial Methylated Spirit, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

SUCROSUM

[Sucros.]

Sucrose

Synonyms. Saccharum Purificatum: Refined Sugar.

$C_{12}H_{22}O_{11}$ . . . . . Mol. Wt. 342·2

Sucrose may be obtained from the juice of the sugar-cane, or of the sugar-beet.

Characters. Colourless crystals or crystalline masses, or a white powder; odourless; taste, sweet.

Readily soluble in 0·5 part of *water*, forming a clear, colourless and odourless syrup; soluble in about 60 parts of *alcohol* (*90 per cent.*).

Tests for Identity. When heated, it melts, swells up and burns, giving off an odour of burnt sugar, and leaving a bulky carbonaceous residue.

To a solution add *N/10 sulphuric acid*, boil, neutralise with *solution of sodium hydroxide*, add *solution of potassio-cupric tartrate*, and heat; a copious red precipitate is produced.

Tests for Purity. *Specific rotation* in a 10 per cent. w/v aqueous solution, not less than + 66°, and not more than + 66·7°.

10 grammes, dissolved in 20 millilitres of hot *water*, forms a clear, colourless and odourless solution which, on the subsequent addition of 1 millilitre of *dilute hypophosphorous acid*, does not develop an unpleasant odour in one hour (absence of ultramarine).

10 grammes, dissolved in 20 millilitres of *water* and heated to 82° with 5 millilitres of *solution of potassio-cupric tartrate*, does not yield more than a trace of a red or yellow precipitate (limit of reducing sugars).

A 10 per cent. w/v solution in *water* is neutral to *litmus*.

To 10 millilitres of a 10 per cent. w/v solution in *water* add 1 millilitre of *dilute sulphuric acid*, and allow to stand for twenty-four hours; no turbidity is produced (limit of barium and strontium).

Arsenic limit, 1 part per million. *Lead limit*, 2 parts per million.

Leaves, on incineration, not more than 0·05 per cent. of residue.

SULPHARSPHENAMINA

[Sulpharsphenamin.]

Sulpharsphenamine

CAUTION.—In any part of the British Empire in which Sulpharsphenamine is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Synonym. Sulpharsenobenzene.

Sulpharsphenamine may be prepared by treating 3:3′-diamino-4:4′-dihydroxyarsenobenzene dihydrochloride with formaldehyde and sodium hydrogen sulphite. It consists mainly of disodium 3:3′-diamino-4:4′-dihydroxyarsenobenzene-*N* : *N*′-dimethylenebisulphite,

$(NH{\cdot}CH_2{\cdot}O{\cdot}SO_2Na)(OH)C_6H_3As : AsC_6H_3(OH)(NH{\cdot}CH_2{\cdot}O{\cdot}SO_2Na)$

It is distributed in hermetically sealed glass phials, from which the air has been evacuated, or replaced by an inert gas.

Characters. A yellow, dry powder, freely mobile in contact with glass surfaces; odour, none, except that due to traces of ether or alcohol.

Soluble in *water*; insoluble in *alcohol (95 per cent.)*, and in *ether*.

Tests for Identity. Decolourises *solution of iodine*.

Dissolve 0·5 gramme in 1·5 millilitres of *water*, and add 5 millilitres of *dilute hydrochloric acid*; no precipitate is produced (distinction from Neoarsphenamine). Boil the mixture; the gas evolved imparts a blue colour to *starch-iodate paper*.

Acidify with *phosphoric acid* a solution of 0·2 gramme in 10 millilitres of *water*, and distil about one half of its volume. To the distillate add 5 drops of a 1 per cent. w/v aqueous solution of *phenol*, and run a layer of *sulphuric acid* under the mixture; a red colour is produced at the zone of contact.

To a 10 per cent. w/v aqueous solution add an equal volume of a 0·01 per cent. w/v solution of *indigo carmine*, and heat for five minutes at 50°; the blue colour remains (distinction from Neoarsphenamine).

Tests for Purity. Add 0·6 gramme to 1 millilitre of *water*; it dissolves rapidly and completely, forming a clear yellow solution, free from suspended matter.

To a 10 per cent. w/v aqueous solution add an equal volume of *N/1 sodium carbonate*; no precipitate is produced (absence of arsphenamine).

When kept in sealed phials at 56° for twenty-four hours, it retains its colour, physical properties, and solubility.

Assay. Carry out the *biological assay of sulpharsphenamine.*

Storage. Sulpharsphenamine should be kept at a temperature below 15°. If it has become darker in colour, it should not be used.

Sterilisation of a Solution. Sulpharsphenamine is prepared in sterile solution for injection by dissolving the contents of a sealed container in the requisite amount of Sterilised Water.

DOSES

Metric.	**Imperial.**
By subcutaneous or intramuscular injection.	
0·1 to 0·6 gramme.	**$1^1/_2$ to 10 grains.**

Sulpharsphenamine contains approximately 20 per cent. of As.

SULPHONAL

[Sulphonal.]

Sulphonal

$(CH_3)_2C(SO_2.C_2H_5)_2$ . . . Mol. Wt. 228·2

Sulphonal is diethylsulphonedimethylmethane, and may be obtained by the oxidation of the product of the interaction of ethyl mercaptan and acetone.

Characters. Colourless, prismatic crystals, or a white powder; odourless; nearly tasteless.

Soluble in 450 parts of *water*, in 15 parts of boiling *water*, in 80 parts of *alcohol (90 per cent.)*, in 90 parts of *ether*, and in 3 parts of *chloroform.*

Tests for Identity and Purity. *Melting-point*, 125° to 127°.

Heat with an equal bulk of *decolourising charcoal* in a dry test-tube; the unpleasant odour of mercaptan is evolved.

Heat with *anhydrous sodium acetate*; hydrogen sulphide is given off.

A saturated aqueous solution is neutral to *litmus* (limit of free acid).

100 millilitres of a cold saturated aqueous solution does not immediately decolourise 1 drop of *N/10 potassium permanganate* (limit of readily oxidisable substances).

Leaves, on incineration, not more than 0·05 per cent. of residue.

DOSES

Metric.	**Imperial.**
0·3 to 1·2 grammes.	**5 to 20 grains.**

SULPHUR PRÆCIPITATUM

[Sulphur. Præcip.]

Precipitated Sulphur

Synonym. Milk of Sulphur.

S . . . . . At. Wt. 32·06

Precipitated Sulphur may be obtained by adding hydrochloric acid to a solution, prepared by boiling sulphur and lime with water.

Characters. A pale greyish-yellow or pale greenish-yellow, soft powder, free from grittiness; free from the odour of hydrogen sulphide; tasteless. Burns with a blue flame, forming sulphur dioxide.

Almost insoluble in *water,* and in *alcohol* (*90 per cent.*); almost completely soluble in *carbon disulphide.*

Test for Identity. Melts at about 115° to a yellow mobile liquid, which becomes dark and viscid on further heating at about 160°.

Tests for Purity. Under a microscope it is seen to consist of grouped amorphous subglobular particles without any admixture of crystals.

Shake 5 grammes with 30 millilitres of *water* for five minutes, filter, and wash thoroughly; the combined filtrate and washings require for neutralisation not more than 1 millilitre of *N/10 sodium hydroxide, solution of phenolphthalein* being used as indicator (limit of acidity).

Arsenic limit, 5 parts per million.

Leaves, on ignition, not more than 0·5 per cent. of residue.

Preparation. Confectio Sulphuris.

DOSES

Metric.	**Imperial.**
1 to 4 grammes.	**15 to 60 grains.**

SULPHUR SUBLIMATUM

[Sulphur. Sublim.]

Sublimed Sulphur

Synonym. Flowers of Sulphur.

S . . . . . At. Wt. 32·06

Sublimed Sulphur may be obtained from native sulphur, or from sulphides.

Characters. A fine, yellow, slightly gritty powder; odourless; tasteless. Burns with a blue flame, forming sulphur dioxide.

Almost insoluble in *water*, and in *alcohol* (*90 per cent.*); incompletely soluble in *carbon disulphide.*

Test for Identity. Melts at about 115° to a yellow mobile liquid, which becomes dark and viscid on further heating to about 160°.

Tests for Purity. Shake 2 grammes with 30 millilitres of boiled and cooled *water* for five minutes, filter, and wash thoroughly; the mixed filtrate and washings require for neutralisation not more than 1 millilitre of *N/10 sodium hydroxide, solution of phenolphthalein* being used as indicator (limit of acidity).

Under a microscope it is seen to consist chiefly of almost opaque, rounded, amorphous particles or aggregates, occasionally associated with semi-crystalline masses.

Shake 1 gramme with 20 millilitres of *carbon disulphide* for ten minutes; the insoluble residue weighs not less than 0·2 gramme.

Arsenic limit, 5 parts per million.

Leaves, on ignition, not more than 0·25 per cent. of residue.

Preparation. Unguentum Sulphuris.

DOSES

Metric.	**Imperial.**
1 to 4 grammes.	**15 to 60 grains.**

SUPPOSITORIA

Suppositories

Suppositories are made with Oil of Theobroma as the basis, unless otherwise directed; the melting-point may be raised, if necessary, to 37°, but not higher, by the addition of White Beeswax. The drug is mixed with, or dissolved in, the melted fatty basis, and poured at a suitable temperature into lubricated moulds of appropriate size. Liquid ingredients may be concentrated, if necessary, by evaporation before incorporation with the basis. Alternatively, where the use of heat is undesirable, methods of cold compression may be used, provided that the drug is uniformly distributed throughout the mass, and that the correct dose is contained in each suppository.

The dose of a drug to be contained in a suppository is stated by the prescriber. In the case of the following suppositories, if the doses of the drugs are not stated by the prescriber, suppositories containing the following quantities shall be dispensed :—

Suppositorium Acidi Tannici : Tannic Acid, 0·2 gramme (3 grains).

Suppositorium Belladonnæ : Liquid Extract of Belladonna, 0·15 mil (2 $^1/_2$ minims), equivalent to about 0·001 gramme ($^1/_{60}$ grain) of the total alkaloids of Belladonna Root.

Suppositorium Iodoformi : Iodoform, 0·2 gramme (3 grains).

Suppositorium Morphinæ : Morphine Hydrochloride, 0·015 gramme ($^1/_4$ grain).

Suppositorium Phenolis. *Synonym.* Suppositorium Acidi Carbolici : Phenol, 0·06 gramme (1 grain).

Suppositorium Plumbi cum Opio. *Synonym.* Suppositorium Plumbi Compositum : Lead Acetate, 0·2 gramme (3 grains) ; Powdered Opium, 0·06 gramme (1 grain).

SUPPOSITORIUM GLYCERINI

[Supp. Glycer.]

Suppository of Glycerin

Gelatin, cut small . . .	14 grammes
Glycerin	70 grammes
Distilled Water. .	a sufficient quantity

Soak the Gelatin in Distilled Water for five minutes, or until thoroughly softened ; drain well, add the Glycerin, dissolve on a water-bath, and evaporate until the mixture weighs 100 grammes. Pour the product into suitable moulds.

Suppository of Glycerin contains about 70 per cent. w/w of Glycerin.

SYRUPUS

[Syr.]

Syrup

Sucrose	667 grammes
Distilled Water, sufficient to produce	1000 grammes

Heat together, until dissolved; add sufficient boiling Distilled Water to produce the required weight.

Tests. *Specific gravity* (15·5°/15·5°), not less than 1·320, and not more than 1·332; *optical rotation*, not less than + 56°, and not more than + 59°.

SYRUPUS AURANTII

[Syr. Aurant.]

Syrup of Orange

Tincture of Orange . . .	125 millilitres
Syrup, sufficient to produce .	1000 millilitres

Mix.

DOSES

Metric.	**Imperial.**
2 to 8 mils.	**30 to 120 minims.**

SYRUPUS FERRI IODIDI

[Syr. Ferr. Iod.]

Syrup of Ferrous Iodide

Synonym. Sirupus ferrosi iodidi co[illegible]tratus I.A.

Syrup of Ferrous Iodide contains 5 per cent. w/w of FeI_2 (limits, 4·75 to 5·25).

Iron	19 grammes
Iodine	58 grammes
Dilute Hypophosphorous Acid .	10 millilitres
Distilled Water . .	a sufficient quantity
Syrup, sufficient to produce .	1000 millilitres

Add the Iron and the Iodine to 90 millilitres of Distilled Water in a flask; shake occasionally, cooling if necessary. When the reaction is completed, heat on a water-bath for five minutes, and, while still hot, filter into the Dilute Hypophosphorous Acid. Rinse the flask, and wash the filter paper with sufficient boiling Distilled Water to make the volume of the filtrate and acid 125 millilitres. Add a sufficient quantity of Syrup to produce the required volume.

Assay. Dilute about 5 grammes, accurately weighed, with 50 millilitres of *water*, add 5 millilitres of *nitric acid* and 25 millilitres of *N/10 silver nitrate*, and titrate with *N/10 ammonium thiocyanate*, using *solution of ferric ammonium sulphate* as indicator. Each millilitre of *N/10 silver nitrate* is equivalent to 0·015485 gramme of FeI_2.

Storage. Syrup of Ferrous Iodide should be kept in a well-filled, well-closed bottle of clear white glass, exposed to light.

DOSES

Metric.	Imperial.
2 to 8 mils.	30 to 120 minims.

Syrup of Ferrous Iodide contains in 8 millilitres about 0·56 gramme of ferrous iodide, equivalent to about 0·1 gramme of iron, and in 120 minims about 7$^1/_2$ grains of ferrous iodide, equivalent to about 1$^1/_3$ grain of iron.

SYRUPUS FERRI PHOSPHATIS COMPOSITUS

[Syr. Ferr. Phosph. Co.]

Compoun[illegible]yrup of Ferrous Phosphate

Synonyms. Parrish's Food: Parrish's Syrup: Chemical Food.

Compound Syrup of Ferrous Phosphate contains iron, equivalent to 0·9 per cent. w/v of anhydrous ferrous phosphate, $Fe_3(PO_4)_2$, (limits, 0·85 to 0·95); and calcium, equivalent to 1·4 per cent. w/v of tricalcium phosphate, $Ca_3(PO_4)_2$, (limits, 1·3 to 1·5).

Iron	4·3	grammes
Phosphoric Acid	48	millilitres
Calcium Carbonate	13·6	grammes
Potassium Bicarbonate	1	gramme
Sodium Phosphate	1	gramme
Cochineal	3·5	grammes
Sucrose	700	grammes
Orange-flower water, of commerce, undiluted	50	millilitres
Distilled Water, sufficient to produce	1000	millilitres

Dilute 20 millilitres of the Phosphoric Acid with 25 millilitres of Distilled Water in a small flask; add the Iron, and heat very gently on a water-bath until dissolved; add the resulting solution to the Calcium Carbonate, Potassium Bicarbonate and Sodium Phosphate, previously triturated with the remainder of the Phosphoric Acid and 80 millilitres of Distilled Water. Boil the Cochineal with 375 millilitres of Distilled Water for fifteen minutes, add the Sucrose, boil for fifteen minutes, cool, strain, and pour over the strainer a sufficient quantity of Distilled Water to produce 800 millilitres. Filter into this syrup the solution containing the iron phosphate, calcium phosphate, potassium phosphate and sodium phosphate, add the orange-flower water, and pass sufficient Distilled Water through the filter to produce the required volume. Set aside for at least forty-eight hours; filter, if necessary.

Assay. *For iron.* Dilute about 20 grammes, accurately weighed, with about 30 millilitres of *water*, add a few drops of *hydrochloric acid*, and a 2 per cent. w/v aqueous solution of *potassium permanganate* drop by drop until a transient pink colour is produced throughout the solution. Add 10 millilitres of *hydrochloric acid* and about 0·5 gramme of *sodium bicarbonate*; then add one drop of *solution of titanous chloride*, or just sufficient for one drop of the mixture to produce a blue colour with one drop of *solution of potassium ferricyanide*. Titrate this solution of ferric iron with *N/10 titanous chloride*, using about 3 millilitres of *solution of ammonium thiocyanate* as indicator. Each millilitre of *N/10 titanous chloride* is equivalent to 0·01192 gramme of $Fe_3(PO_4)_2$.

For calcium. Dilute about 20 grammes, accurately weighed, with 150 millilitres of *water.* Add 3 grammes of *citric acid,* heat to boiling, make alkaline with *dilute solution of ammonia,* and add 20 millilitres of *acetic acid;* to the boiling solution add 50 millilitres of *solution of ammonium oxalate,* and boil the mixture gently on a sand-bath for two hours; filter off the precipitate, wash, dry, moisten with *sulphuric acid,* ignite gently, and weigh the residue. 1 gramme of the residue is equivalent to 0·7597 gramme of $Ca_3(PO_4)_2$.

Determine the *specific gravity* (15·5°/15·5°), and calculate the proportions of anhydrous ferrous phosphate, and of tricalcium phosphate, weight in volume.

Storage. Compound Syrup of Ferrous Phosphate should be kept in a well-filled bottle.

DOSES

Metric.	Imperial.
2 to 8 mils.	30 to 120 minims.

Compound Syrup of Ferrous Phosphate contains in 8 mils the equivalent of about 0·07 gramme of anhydrous ferrous phosphate, or about 0·034 gramme of iron, and the equivalent of about 0·11 gramme of tricalcium phosphate; and in 120 minims the equivalent of about $1^{1}/_{6}$ grain of anhydrous ferrous phosphate, or about $^{1}/_{2}$ grain of iron, and the equivalent of about $1^{3}/_{4}$ grains of tricalcium phosphate.

SYRUPUS FERRI PHOSPHATIS CUM QUININA ET STRYCHNINA

[Syr. Ferr. Phosph. c. Quinin. et Strych.]

Syrup of Ferrous Phosphate with Quinine and Strychnine

Synonym. Easton's Syrup.

Syrup of Ferrous Phosphate with Quinine and Strychnine contains iron, equivalent to 1·8 per cent. w/v of anhydrous ferrous phosphate, $Fe_3(PO_4)_2$, (limits, 1·62 to 1·98), 1·09 per cent. w/v of anhydrous quinine (limits, 1·04 to 1·2), and 0·0246 per cent. w/v of strychnine (limits, 0·022 to 0·027).

Iron	8·6	grammes
Phosphoric Acid	40	millilitres
Strychnine Hydrochloride	0·3	gramme
Quinine Sulphate	14·8	grammes
Syrup	560	millilitres
Glycerin	140	millilitres
Distilled Water, sufficient to produce	1000	millilitres

Dilute the Phosphoric Acid with 80 millilitres of Distilled Water; add it to the Iron contained in a flask of suitable size, and heat on a water-bath, until the Iron is dissolved; add the solution to the Strychnine Hydrochloride and the Quinine Sulphate, previously triturated with 30 millilitres of Distilled Water; when solution is complete make up to 250 millilitres with Distilled Water; filter it into the Syrup and Glycerin, previously mixed, and pass sufficient Distilled Water through the filter to produce the required volume.

Assay. *For iron.* Carry out the method for the Assay for iron, described under 'Syrupus Ferri Phosphatis Compositus'. Each millilitre of *N/10 titanous chloride* is equivalent to 0·01192 gramme of $Fe_3(PO_4)_2$.

For quinine. Mix in a separator about 100 millilitres, accurately weighed, with 5 grammes of *sodium citrate*, dissolved in 100 millilitres of *water*. Add 30 millilitres of *solution of sodium hydroxide*, and extract with successive quantities of *chloroform*, until *complete extraction* of the alkaloids is effected, washing each chloroform solution with the same 20 millilitres of *water* contained in a second separator. Evaporate the chloroform, add to the residue 5 millilitres of *alcohol* (*95 per cent.*), evaporate, dry at 100°, and weigh the residue of anhydrous quinine and strychnine. Subtract the weight of strychnine obtained in the assay for strychnine.

For strychnine. Dissolve the quinine and strychnine, obtained in the Assay for quinine, in 20 millilitres of *N/1 hydrochloric acid*, and transfer to a separator, washing out the flask with a further 5 millilitres of *N/1 hydrochloric acid*, followed by 25 millilitres of a saturated solution of *sodium chloride*, transferring each washing to the separator. Extract the liquid by shaking with five successive quantities of 25 millilitres of *chloroform*, and for five minutes with each quantity. Wash the mixed chloroform solutions by shaking for five minutes with two quantities of 5 millilitres of a mixture of equal volumes of

N/1 hydrochloric acid and a saturated solution of *sodium chloride*. Extract the mixed washings by shaking with 10 millilitres of *chloroform*, and add the latter to the mixed chloroform solutions. Shake the mixed chloroform solutions with a mixture of 20 millilitres of *water* and 5 millilitres of *dilute solution of ammonia* ; separate and wash the chloroform solution by shaking with 5 millilitres of *water*. Remove the chloroform, add 1 millilitre of *alcohol* (*95 per cent.*), evaporate, and dry at 100°. Wash the residue with three quantities of 2 millilitres each of a mixture of 2 volumes of *ether* and 1 volume of *light petroleum* (*boiling-point, 50° to 60°*), the solvent having been previously saturated with strychnine. Decant off the solvent each time through a small plug of cotton wool. Wash any alkaloid in the cotton wool back into the flask with 3 millilitres of *chloroform*. Add 1 millilitre of *alcohol* (*95 per cent.*), evaporate, dry at 100°, and weigh the strychnine.

Determine the *specific gravity* (15·5°/15·5°), and calculate the proportions of anhydrous ferrous phosphate, of anhydrous quinine, and of strychnine, weight in volume.

Storage. Syrup of Ferrous Phosphate with Quinine and Strychnine should be kept in a completely-filled, well-closed container, and protected from light.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

Syrup of Ferrous Phosphate with Quinine and Strychnine contains in 4 mils the equivalent of 0·072 gramme of anhydrous ferrous phosphate, or about 0·034 gramme of iron, about 0·059 gramme of Quinine Sulphate, and about 0·0012 gramme of Strychnine Hydrochloride; and in 60 minims the equivalent of about 1 grain of anhydrous ferrous phosphate, or about $^1/_2$ grain of iron, about $^4/_5$ grain of Quinine Sulphate, and about $^1/_{60}$ grain of Strychnine Hydrochloride.

Syrup of Ferrous Phosphate with Quinine and Strychnine contains approximately one half the proportion of strychnine contained in the corresponding preparation of the British Pharmacopœia, 1914.

SYRUPUS GLUCOSI LIQUIDI

[Syr. Glucos. Liq.]

Syrup of Liquid Glucose

Synonyms. Syrupus Glucosi: Syrup of Glucose.

Liquid Glucose . . .	333 grammes
Syrup	667 grammes

Mix, by the aid of gentle heat.

SYRUPUS LIMONIS

[Syr. Limon.]

Syrup of Lemon

Lemon Peel, in thin slices .	60 grammes
Alcohol (60 per cent.) .	a sufficient quantity
Citric Acid, in powder . .	24 grammes
Syrup, sufficient to produce .	1000 millilitres

Macerate the Lemon Peel in 70 millilitres of Alcohol (60 per cent.) for seven days; press, filter, and add to the filtrate sufficient Alcohol (60 per cent.) to produce 100 millilitres; dissolve the Citric Acid in the liquid, and mix with a sufficient quantity of Syrup to produce the required volume.

Storage. Syrup of Lemon should be kept in a container which has previously been washed with boiling water, and should be stored in a cool place.

DOSES

Metric.	**Imperial.**
2 to 8 mils.	**30 to 120 minims.**

SYRUPUS PRUNI SEROTINÆ

[Syr. Prun. Serot.]

Syrup of Wild Cherry

Synonyms. Syrupus Pruni Virginianæ: Syrup of Virginian Prune.

Wild Cherry Bark, in *moderately coarse powder* . . .	150 grammes
Sucrose, in powder . . .	800 grammes
Glycerin	50 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Mix the Glycerin with 200 millilitres of Distilled Water, and moisten the Wild Cherry Bark with 100 millilitres of the mixture; set aside for twenty-four hours in a closed vessel, pack in a percolator; pour on the remainder of the mixture; receive the percolate in a bottle, graduated at 1000 millilitres and having a capacity of 2000 millilitres, in which the Sucrose has been placed, and continue the percolation with Distilled Water until the whole measures 1000 millilitres; close the bottle and dissolve the Sucrose by agitation and without heat; add sufficient Distilled Water to produce the required volume.

Storage. Syrup of Wild Cherry should be kept in a well-closed container, and stored in a cool place.

DOSES

Metric.	Imperial.
2 to 8 mils.	30 to 120 minims.

SYRUPUS SCILLÆ

[Syr. Scill.]

Syrup of Squill

Syrup of Squill contains active constituents approximately equivalent to 4·5 per cent. w/v of Squill.

Vinegar of Squill . . .	450 millilitres
Sucrose	800 grammes
Distilled Water, sufficient to produce	1000 millilitres

Dissolve the Sucrose in the Vinegar of Squill by the aid of gentle heat; strain, and, when cold, add sufficient Distilled Water to produce the required volume.

DOSES

Metric.	Imperial.
2 to 4 mils.	30 to 60 minims.

SYRUPUS SENNÆ

[Syr. Senn.]

Syrup of Senna

Liquid Extract of Senna .	250 millilitres
Oil of Coriander . . .	1·5 millilitres
Sucrose	700 grammes
Distilled Water, sufficient to produce	1000 millilitres

Mix the Oil of Coriander and the Liquid Extract of Senna, and gradually add 300 millilitres of Distilled Water. Set aside in a cool place, with occasional shaking, for twenty-four hours, filter, and pour sufficient Distilled Water over the filter to produce 550 millilitres of filtrate. Dissolve the Sucrose in the filtrate, and add sufficient Distilled Water to produce the required volume. Set aside for at least forty-eight hours; strain, if necessary.

DOSES

Metric.	**Imperial.**
2 to 8 mils.	**30 to 120 minims.**

SYRUPUS TOLUTANUS

[Syr. Tolu.]

Syrup of Tolu

Synonym. Syrup of Balsam of Tolu.

Balsam of Tolu	25 grammes
Sucrose	660 grammes
Distilled Water, sufficient to produce	1000 grammes

Add 400 millilitres of boiling Distilled Water to the Balsam of Tolu, contained in a tared vessel; cover it lightly, and boil the contents gently for half an hour, stirring frequently. Add Distilled Water, if necessary, so that the contents of the vessel weigh 360 grammes. Cool, filter the solution, add the Sucrose, dissolve by the aid of a water-bath, and finally add sufficient Distilled Water to produce the required weight.

DOSES

Metric.	**Imperial.**
2 to 8 mils.	**30 to 120 minims.**

SYRUPUS ZINGIBERIS

[Syr. Zingib.]

Syrup of Ginger

Strong Tincture of Ginger	. 50 millilitres
Syrup, sufficient to produce	. 1000 millilitres

Mix.

DOSES

Metric.	Imperial.
2 to 8 mils.	30 to 120 minims.

TABELLA GLYCERYLIS TRINITRATIS

[Tab. Glyc. Trinit.]

Tablet of Glyceryl Trinitrate

Synonyms. Tabellæ Trinitrini : Trinitrin Tablets : Tablets of Nitroglycerin.

Tablet of Glyceryl Trinitrate is a tablet of chocolate, weighing 0·3 gramme, and containing 0·0005 gramme of glyceryl trinitrate, $C_3H_5(NO_3)_3$.

DOSE

1 or 2 tablets.

Each Tablet of Glyceryl Trinitrate contains 0·0005 gramme, or about $^1/_{130}$ grain, of glyceryl trinitrate.

TAMARINDUS

[Tamarind.]

Tamarind

Tamarind consists of the fruits of *Tamarindus indica* Linn., freed from the brittle outer part of the pericarp, and preserved with sugar.

Characters. A reddish-brown, moist, sugary mass, containing yellowish-brown strong branched fibres, and reddish-brown subrectangular shining seeds each enclosed within a tough pericarpic membrane. Odour, fragrant and fruity; taste, sweet and acid.

Test for Purity. Yields no *reactions* characteristic of copper.

TEREBENUM

[Tereben.]

Terebene

Terebene is a mixture of dipentene and other hydrocarbons, obtained by steam-distilling the product of the limited action of sulphuric acid on oil of turpentine.

Characters. A colourless, or very pale yellow, liquid; odour, agreeable and characteristic; taste, aromatic and terebinthinate.

Almost insoluble in *water*; miscible with *dehydrated alcohol*, with *ether*, and with *chloroform*.

Tests for Identity and Purity. Soluble in 5 volumes of *alcohol* (*90 per cent.*); *specific gravity* (15·5°/15·5°), 0·862 to 0·870; *optical rotation*, − 2° to + 2°; *refractive index* at 20°, 1·471 to 1·474; *boiling-point*, it distils between 160° and 190°, leaving only a slight viscous residue; not less than 80 per cent. distils between 165° and 185°.

2 grammes leaves, when evaporated rapidly in a flat dish on a water-bath, not more than 0·04 gramme of residue.

DOSES

Metric.	**Imperial.**
0·3 to 1 mil.	**5 to 15 minims.**

THEOBROMINA ET SODII SALICYLAS

[Theobrom. et Sod. Salicyl.]

Theobromine and Sodium Salicylate

Theobromine and Sodium Salicylate is a mixture of sodium theobromine and sodium salicylate in approximately molecular proportions, and may be prepared by the interaction of sodium hydroxide, theobromine, and sodium salicylate. It contains not less than 46 per cent. of theobromine, $C_7H_8O_2N_4$, not less than 41 per cent. of sodium salicylate, $C_7H_5O_3Na$, and not more than 6·9 per cent. of sodium, Na, additional to that contained in the sodium salicylate, all calculated with reference to the substance dried at 110°.

Characters. A white, amorphous powder; odourless; taste, sweetish and alkaline.

Soluble in 1 part of *water*; insoluble in *alcohol (90 per cent.)*, in *ether*, and in *chloroform*.

Tests for Identity. A 5 per cent. w/v aqueous solution is strongly alkaline to *phenolphthalein*.

The residue, left after incineration, yields the *reactions* characteristic of sodium, and of carbonates.

To an aqueous solution, acidified with *dilute acetic acid*, add *test-solution of ferric chloride*; a violet colour is produced.

To an aqueous solution add *hydrochloric acid*, until neutral; a white precipitate of theobromine is produced, which, after washing with water, yields a purple colour when treated with *hydrochloric acid, potassium chlorate* and ammonia vapour as described under 'Caffeina'.

Tests for Purity. A 20 per cent. w/v aqueous solution is clear and colourless, or faintly yellow.

Dissolve 1 gramme in 10 millilitres of *water*, add a few millilitres of *solution of sodium hydroxide*, and shake with 10 millilitres of *chloroform*. Separate the chloroform layer; evaporate it to dryness on a water-bath, and dry at 80°; the residue weighs not more than 0·005 gramme (limit of caffeine).

Arsenic limit, 2 parts per million. *Lead limit*, 10 parts per million.

Loses, when dried at 110°, not more than 5 per cent. of its weight.

Assay. *For theobromine.* Dissolve about 1 gramme, accurately weighed, in 10 millilitres of *water* in a small stoppered flask, add 2 millilitres of *N/1 sodium hydroxide* and 0·6 millilitre of *dimethyl sulphate*. Shake continuously for five minutes and set aside for half an hour, shaking frequently. Add 3 millilitres of *N/1 sodium hydroxide*, and shake well for one or two minutes. Transfer to a separator with the aid of *chloroform* and a little *water*, and extract the caffeine immediately by shaking with successive quantities of *chloroform*, washing each chloroform solution with the same 10 millilitres of *water* contained in a second separator. Mix the chloroform solutions, remove the chloroform, dry the residue of caffeine at 100°, for one hour, and weigh. 1 gramme of caffeine is equivalent to 0·9278 gramme of theobromine, $C_7H_8O_2N_4$.

For sodium salicylate. Dissolve about 1 gramme, accurately weighed, in 20 millilitres of *water*, slightly acidify with *dilute hydrochloric acid*, add *dilute solution of ammonia* until the liquid is faintly alkaline, and set aside for three hours at about 15·5°, stirring frequently. Filter, and wash the precipitate with 20 millilitres of *water*, added in small quantities. To the mixed filtrate and washings add 5 millilitres of *dilute hydrochloric acid*, extract the liberated salicylic acid with successive quantities of *ether*, mix the ethereal solutions, wash with 10 millilitres of *water*, and remove the ether. Dissolve the residue in 10 millilitres of warm *alcohol* (*95 per cent.*), previously neutralised to *phenol red*, add 20 millilitres of *water*, and titrate with *N/10 sodium hydroxide*, using *solution of phenol red* as indicator. Each millilitre of *N/10 sodium hydroxide* is equivalent to 0·0160 gramme of $C_7H_5O_3Na$.

For additional sodium. Dissolve about 2 grammes, accurately weighed, in 10 millilitres of warm *water*, and titrate with *N/1 hydrochloric acid*, using *solution of phenol red* as indicator. Each millilitre of *N/1 hydrochloric acid* corresponds to 0·0230 gramme of Na.

Storage. Theobromine and Sodium Salicylate should be kept in a well-closed, glass-stoppered bottle, protected from light.

DOSES

Metric.	**Imperial.**
0·6 to 1·2 grammes.	**10 to 20 grains.**

THEOPHYLLINA ET SODII ACETAS

[Theophyll. et Sod. Acet.]

Theophylline and Sodium Acetate

Theophylline and Sodium Acetate may be prepared by dissolving equimolecular proportions of sodium theophylline and sodium acetate in water, and evaporating to dryness. It contains not less than 55 per cent. of anhydrous theophylline, $C_7H_8O_2N_4$.

Characters. A white, crystalline powder; odourless; taste, bitter.

Soluble in about 25 parts of *water*; insoluble in *alcohol* (*90 per cent.*), in *ether*, and in *chloroform*.

An aqueous solution is alkaline to *litmus*.

Tests for Identity. Dissolve 0·5 gramme in 10 millilitres of *water*, and neutralise with *dilute acetic acid*; a white crystalline precipitate of theophylline is produced.

The precipitate obtained in the preceding test, after being washed and dried at 100°, complies with the following tests:—

Melting-point, 265° to 272°.

Treat a few milligrams with *hydrochloric acid*, *potassium chlorate* and ammonia vapour as described under 'Caffeina'; a purple colour is produced.

0·1 gramme dissolves completely in 2·5 millilitres of *dilute solution of ammonia* (distinction from theobromine).

Suspend 0·1 gramme in 2 millilitres of *alcohol* (*70 per cent.*), add a few drops of *sulphuric acid*, and boil; the characteristic odour of ethyl acetate is produced.

Tests for Purity. Dissolve 0·5 gramme in 20 millilitres of *water*, add 5 millilitres of *2N sodium hydroxide*, and shake with 10 millilitres of *chloroform*. Separate the chloroform layer, wash it with a very little *water*, evaporate it to dryness on a water-bath, and dry at 80°; the residue weighs not more than 0·0025 gramme (limit of caffeine).

Arsenic limit, 2 parts per million.

Assay. Diffuse about 1 gramme, accurately weighed, in 5 millilitres of *water* and 4·5 millilitres of *N/1 sodium hydroxide* in a small stoppered flask. Add 0·8 millilitre of *dimethyl sulphate*, shake until solution is complete, and set aside for one hour, shaking occasionally. Add 5 millilitres of *N/1 sodium hydroxide* and 10 millilitres of *water*, and shake for one minute. Transfer to a separator with the aid of *chloroform* and a little *water*, and extract the caffeine immediately by shaking with successive quantities of *chloroform*, washing each chloroform solution with 10 millilitres of *water* contained in a second separator. Mix the chloroform solutions, remove the chloroform, dry the residue of caffeine at 100° for one hour, and weigh. 1 gramme of caffeine is equivalent to 0·9278 gramme of anhydrous theophylline, $C_7H_8O_2N_4$.

DOSES

Metric.	Imperial.
0·12 to 0·3 gramme.	**2 to 5 grains.**

THYMOL

[Thymol.]

Thymol

$CH_3{\cdot}C_6H_3(OH){\cdot}C_3H_7$ $[CH_3 : OH : C_3H_7 = 1 : 3 : 4]$

Mol. Wt. 150·1

Thymol is a crystalline phenol, obtained from the volatile oils of *Thymus vulgaris* Linn., of *Monarda punctata* Linn., and of *Trachyspermum Ammi* (Linn.) Sprague, or prepared synthetically.

Characters. Colourless crystals; odour, pungent, aromatic and thyme-like; taste, pungent and aromatic.

It sinks in cold *water* and, when the temperature is raised to about 45°, melts and rises to the surface.

Soluble in about 1000 parts of *water*, in 1 part of *alcohol (90 per cent.)*, in 1·5 parts of *ether*, and in 0·6 part of *chloroform*.

Tests for Identity and Purity. *Melting-point*, 48° to 51°.

An alcoholic solution is optically inactive, and neutral to *litmus.*

Heat 1 gramme in a test tube in a water-bath with 5 millilitres of a 10 per cent. w/v solution of *sodium hydroxide*; a clear, colourless or pale red solution is formed, which becomes darker on standing, and oily drops do not separate; on adding a few drops of *chloroform* and agitating the mixture, a violet colour is produced.

Leaves, when heated in an open dish on a water-bath, not more than 0·05 per cent. of residue.

DOSES

Metric.	**Imperial.**
0·03 to 0·12 gramme.	**$^1/_2$ to 2 grains.**
Anthelmintic doses	
1 to 2 grammes.	**15 to 30 grains.**

THYROIDEUM

[Thyroid.]

Thyroid

CAUTION.—In any part of the British Empire in which Thyroid is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Synonyms. Thyroideum Siccum: Dry Thyroid: Thyroid Extract: Thyroid Gland.

Thyroid is prepared from the thyroid gland of oxen, sheep, or pigs. It contains 0·1 per cent. of iodine in combination as thyroxine (limits, 0·09 to 0·11), and (not more inorganic iodine than 10 per cent. of the content of total iodine.) Delete

Remove the connective tissue and external fat from the thyroid glands. Dry the glands at a temperature not greater than 60°; powder; remove all fat by extraction with *light petroleum* (*boiling-point, 50° to 60°*), and dry the residue. Determine the proportion of iodine in combination as thyroxine, and mix the residue with a sufficient quantity of Lactose to produce a powder of the required strength.

Characters. A cream-coloured, amorphous powder; odour and taste, faint and meat-like.

Test for Identity. Boil a small quantity for four hours with *N/1 sodium hydroxide*, and adjust the resulting solution to *p*H 5 by the addition of a 50 per cent. v/v aqueous solution of *sulphuric acid*; the precipitate formed gives the Test for Identity, described under 'Thyroxinsodium'.

Assay. Boil 10 grammes, accurately weighed, with 100 millilitres of *N/1 sodium hydroxide* under a reflux condenser for four hours; filter, while hot, through a suction filter, and add sufficient *water* to produce, when cool, 500 millilitres. Use this solution for the determination of total iodine, and of iodine in combination as thyroxine.

For total iodine. Evaporate 25 millilitres on a water-bath to 5 millilitres, place in a nickel crucible, and carry out the Assay as directed under 'Thyroxinsodium', omitting the addition of albumen and commencing with the words 'add about . . . 5 grammes of *sodium hydroxide*, and drive off the water . . .'. Each millilitre of *N/200 sodium thiosulphate* is equivalent to 0·1058 milligram of total iodine.

For iodine in combination as thyroxine. Make 250 millilitres faintly acid to *Congo-red* with a 50 per cent. v/v aqueous solution of *sulphuric acid*, set aside for twenty-four hours, and filter. Evaporate 50 millilitres of the filtrate on a water-bath to 5 millilitres, place in a nickel crucible, and carry out the Assay as directed under 'Thyroxinsodium', omitting the addition of albumen and commencing with the words 'add about . . . 5 grammes of *sodium hydroxide* and drive off the water . . .'. Each millilitre of *N/200 sodium thiosulphate* is equivalent to 0·1058 milligram of iodine not in combination as thyroxine.

The difference between the percentage of total iodine and the percentage of iodine not in combination as thyroxine is the percentage of iodine in combination as thyroxine.

For inorganic iodine. Extract 1 gramme, accurately weighed, with 10 millilitres of cold *water*, and filter. Place the filtrate in a nickel crucible, and carry out the Assay as directed under 'Thyroxinsodium', omitting the addition of albumen, and commencing with the words 'add about . . . 5 grammes of *sodium hydroxide* and drive off the water . . .'. Each millilitre of *N/200 sodium thiosulphate* is equivalent to 0·1058 milligram of inorganic iodine.

Storage. Thyroid should be kept in a well-closed container, and stored in a cool place.

DOSES

Metric.	Imperial.
0·08 to 0·3 gramme.	$^{1}/_{2}$ to 5 grains.

THYROXINSODIUM

[Thyroxinsod.]

Thyroxine-sodium

$C_{15}H_{10}O_4NI_4Na$ . . . Mol. Wt. 798·8

Thyroxine-sodium is the mono-sodium salt of *dl*–β–[3:5–diiodo–4–(3′:5′–diiodo–4′–hydroxyphenoxy)phenyl]–*a*–aminopropionic acid. It may be prepared by the action of a limited amount of sodium carbonate upon thyroxine, obtained by the controlled hydrolysis of thyroid gland with barium hydroxide and subsequent purification, or by synthesis. It contains not less than 61 per cent., and not more than 65 per cent., of I.

Characters. A white, crystalline powder.

Sparingly soluble in cold *water*; more soluble in *solution of sodium carbonate*, and in *solution of sodium hydroxide*.

Unstable in alkaline solutions.

Test for Identity. Dissolve about 0·005 gramme in 2 millilitres of *alcohol (50 per cent.)* with the aid of one drop of *hydrochloric acid*, add one drop of a 20 per cent. w/v solution of *sodium nitrite* in *water*; a yellow colour is produced which deepens on boiling, and changes to red, when the liquid is cooled and treated with excess of *strong solution of ammonia*.

Assay. Dissolve about 0·02 gramme, accurately weighed, in 50 millilitres of *2N sodium hydroxide*. Place 5 millilitres in a nickel crucible; add about 0·1 gramme of *albumen* and 5 grammes of *sodium hydroxide*, and drive off the water by heating with a Bunsen burner. Continue the fusion by heating strongly in a sand-bath with occasional additions of a few milligrammes of *potassium nitrate*, until all organic matter is destroyed. Cool, and, by the gradual addition of 200 millilitres of *water*, transfer the fused substance to a wide-mouthed 500-millilitre conical flask. Add *solution of methyl orange*, 1 millilitre of a 10 per cent. w/v aqueous solution of *sodium metabisulphite*, and then *phosphoric acid* until the solution is faintly pink; add sufficient *bromine* to colour the solution strongly yellow, and boil briskly for ten minutes, with the addition of a little *powdered talc* to promote smooth ebullition. Add 10 drops of a 5 per cent. w/v aqueous solution of *sodium salicylate*, cool, and add 5 millilitres of *solution of potassium iodide* and 5 millilitres of *phosphoric acid*; titrate with *N/200 sodium thiosulphate*, using *mucilage of starch* as indicator. Each millilitre of *N/200 sodium thiosulphate* is equivalent to 0·1058 milligram of I.

Storage. Thyroxine-sodium should be kept in a well-closed container.

DOSES

Metric.	**Imperial.**
0·0001 to 0·001 gramme.	**$^1/_{640}$ to $^1/_{64}$ grain.**

When thyroxine is ordered, Thyroxinsodium may be dispensed.

TINCTURÆ

Tinctures

General Processes

(*a*) *Maceration.* Place the solid materials with the whole of the menstruum in a closed vessel; shake occasionally during seven days; strain; press the marc; mix the liquids obtained. Clarify by subsidence, or by filtration.

(*b*) *Percolation.* Moisten the solid materials with a sufficient quantity of menstruum, set aside for four hours in a well-closed vessel, pack in a percolator, and add sufficient of the menstruum to saturate the materials. When the liquid commences to drip from the percolator close the outlet, add sufficient of the menstruum to leave a layer above the drug, and allow it to macerate for twenty-four hours. Allow percolation to proceed slowly, until the percolate measures about three-fourths of the volume required for the finished tincture. Press the marc, mix the expressed liquid with the percolate, and add sufficient of the menstruum to produce the required volume. Clarify by subsidence, or by filtration.

TINCTURA ASAFŒTIDÆ

[Tinct. Asafœt.]

Tincture of Asafetida

Asafetida, bruised	200 grammes
Alcohol (70 per cent.), sufficient to produce	1000 millilitres

Macerate the Asafetida in a closed vessel with 750 millilitres of Alcohol (70 per cent.) for seven days, shaking occasionally; filter; pass sufficient Alcohol (70 per cent.) through the filter to produce the required volume.

Alcohol content, 60 to 65 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
2 to 4 mils.	**30 to 60 minims.**

TINCTURA AURANTII

[Tinct. Aurant.]

Tincture of Orange

Fresh Bitter-Orange Peel, in thin slices	250 grammes
Alcohol (90 per cent.) . .	1000 millilitres

Prepare by the Maceration Process.

Alcohol content, 73 to 78 per cent. v/v of ethyl alcohol.

Preparation. Syrupus Aurantii.

DOSES

Metric.	Imperial.
2 to 4 mils.	**30 to 60 minims.**

TINCTURA BELLADONNÆ

[Tinct. Bellad.]

Tincture of Belladonna

Tincture of Belladonna contains 0·03 per cent. w/v of the alkaloids of Belladonna Leaf, calculated as hyoscyamine (limits, 0·028 to 0·032).

Belladonna Leaf, in *moderately coarse powder* . . .	100 grammes
Alcohol (70 per cent.) .	a sufficient quantity

Prepare 1000 millilitres of a tincture by the Percolation Process. Determine the proportion of alkaloids in this tincture, by the Assay described below, and add, if necessary, sufficient Alcohol (70 per cent.) to produce a Tincture of Belladonna of the required strength.

Assay. Evaporate 100 millilitres on a water-bath to about 10 millilitres, add, if necessary, sufficient *alcohol* (*95 per cent.*) to dissolve any separated substance, and transfer to a separator, rinsing the vessel with a little *water*. Add 10 millilitres of *water* and 2 millilitres of *dilute solution of ammonia*, and shake with successive portions of *chloroform*, until *complete extraction* of the alkaloids is effected. Shake the mixed chloroform solutions with successive portions of *N/5 sulphuric acid*, until *complete extraction* of the alkaloids is effected. Complete the Assay as directed under 'Belladonnæ Folium', commencing with the words 'Wash the mixed acid solutions . . .'.

Alcohol content, 64 to 69 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
0·3 to 2 mils.	5 to 30 minims.

Tincture of Belladonna contains in 2 mils 0·0006 gramme, and in 30 minims about 1/100 grain, of the alkaloids of Belladonna Leaf, calculated as hyoscyamine.

TINCTURA BENZOINI COMPOSITA

[Tinct. Benzoin. Co.]

Compound Tincture of Benzoin

Synonym. Friars' Balsam.

Benzoin, crushed . . .	100 grammes
Storax	75 grammes
Balsam of Tolu . . .	25 grammes
Aloes	20 grammes
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Macerate the Benzoin, Storax, Balsam of Tolu, and Aloes with 800 millilitres of Alcohol (90 per cent.) in a closed vessel for not less than two days, shaking occasionally;

filter; pass sufficient Alcohol (90 per cent.) through the filter to produce the required volume.

Alcohol content, 70 to 77 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

TINCTURA CALUMBÆ

[Tinct. Calumb.]

Tincture of Calumba

Calumba, in *moderately coarse powder*	100 grammes
Alcohol (60 per cent.) . .	1000 millilitres

Prepare by the Maceration Process.

Alcohol content, 57 to 60 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

TINCTURA CAPSICI

[Tinct. Capsic.]

Tincture of Capsicum

Capsicum, in *moderately coarse powder*	50 grammes
Alcohol (60 per cent.) . .	1000 millilitres

Prepare by the Maceration Process.

Alcohol content, 57 to 60 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
0·3 to 1 mil.	**5 to 15 minims.**

TINCTURA CARDAMOMI COMPOSITA

[Tinct. Cardam. Co.]

Compound Tincture of Cardamom

Cardamom, in *moderately coarse powder*	14 grammes
Caraway, in *moderately coarse powder*	14 grammes
Cinnamon, in *moderately coarse powder*	28 grammes
Cochineal, in *moderately coarse powder*	7 grammes
Glycerin	50 millilitres
Alcohol (60 per cent.), sufficient to produce	1000 millilitres

Moisten the mixed powders with a sufficient quantity of Alcohol (60 per cent.), and prepare 900 millilitres of tincture by the Percolation Process. Add the Glycerin and sufficient Alcohol (60 per cent.) to produce the required volume. Filter, if necessary.

Alcohol content, 52 to 57 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**80 to 60 minims.**

TINCTURA CATECHU

[Tinct. Catech.]

Tincture of Catechu

Catechu, crushed	200 grammes
Cinnamon, bruised	50 grammes
Alcohol (45 per cent.)	1000 millilitres

Prepare by the Maceration Process.

Alcohol content, 37 to 40 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**80 to 60 minims.**

TINCTURA CINCHONÆ

[Tinct. Cinchon.]

Tincture of Cinchona

Tincture of Cinchona contains 1 per cent. w/v of the alkaloids of Cinchona (limits, 0·95 to 1·05).

Extract of Cinchona . . .	100 grammes
Alcohol (70 per cent.), sufficient to produce	1000 millilitres

Mix; set aside for not less than twenty-four hours; filter.

Assay. Evaporate 25 millilitres to about 2 or 3 millilitres, and complete the Assay as directed under 'Extractum Cinchonæ', commencing with the words 'wash it into a separator . . .'.

Alcohol content, 64 to 66 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
2 to 4 mils.	30 to 60 minims.

Tincture of Cinchona contains in 4 mils 0·04 gramme, and in 60 minims about $^3/_5$ grain, of the alkaloids of Cinchona.

TINCTURA CINCHONÆ COMPOSITA

[Tinct. Cinchon. Co.]

Compound Tincture of Cinchona

Compound Tincture of Cinchona contains 0·5 per cent. w/v of the alkaloids of Cinchona (limits, 0·475 to 0·525).

Extract of Cinchona . . .	50 grammes
Dried Bitter-Orange Peel, bruised	50 grammes
Serpentary, in *moderately fine powder*	25 grammes
Cochineal, in *moderately coarse powder*	3 grammes
Alcohol (70 per cent.), sufficient to produce	1000 millilitres

Mix the Dried Bitter-Orange Peel, Serpentary, and Cochineal with 900 millilitres of Alcohol (70 per cent.); set aside in a closed vessel for seven days, shaking frequently; strain; press the marc; mix the liquids; dissolve the Extract of Cinchona in the mixed liquids; add sufficient Alcohol (70 per cent.) to produce the required volume; set aside for not less than forty-eight hours; filter.

Assay. Evaporate 25 millilitres to about 2 or 3 millilitres, and complete the Assay as directed under 'Extractum Cinchonæ', commencing with the words 'wash it into a separator . . .', and using, in the final extraction of the alkaloids, successive quantities of 35 millilitres of *chloroform.*

Alcohol content, 63 to 67 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

Compound Tincture of Cinchona contains in 4 mils 0·02 gramme, and in 60 minims about $^1/_4$ grain, of the alkaloids of Cinchona.

TINCTURA COCCI

[Tinct. Cocc.]

Tincture of Cochineal

Cochineal, in *moderately coarse powder*	100 grammes
Alcohol (45 per cent.) . .	1000 millilitres

Prepare by the Maceration Process.

Alcohol content, 42 to 45 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
0·3 to 1 mil.	**5 to 15 minims.**

TINCTURA COLCHICI

[Tinct. Colch.]

Tincture of Colchicum

Tincture of Colchicum contains 0·03 per cent. w/v of colchicine (limits, 0·027 to 0·033).

Liquid Extract of Colchicum .	100 millilitres
Alcohol (60 per cent.), sufficient to produce	1000 millilitres

Mix; set aside for not less than twelve hours; filter.

Assay. Evaporate to dryness 200 millilitres on a water-bath, and complete the Assay as directed under 'Colchici Semen', commencing with the words 'wash the residue into a separator with 20 millilitres of a 20 per cent. w/v aqueous solution of *sodium sulphate* . . .'. 40 millilitres of the filtrate represents 160 millilitres of the tincture of colchicum being assayed.

Alcohol content, 58 to 60 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
0·3 to 1 mil.	**5 to 15 minims.**

Tincture of Colchicum contains in 1 mil 0·0003 gramme, and in 15 minims about $^1/_{250}$ grain, of colchicine.

TINCTURA DIGITALIS

[Tinct. Digit.]

Tincture of Digitalis

CAUTION.—In any part of the British Empire in which Tincture of Digitalis is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Tincture of Digitalis possesses 1 Unit of activity (equivalent to the activity of 0·1 gramme of the *international standard digitalis powder*), in 1 millilitre.

It is prepared by one of the following methods:—

1. Preparation from Digitalis Leaf (Digitalis Folium).

Digitalis Leaf, in *moderately coarse powder* . . .	100 grammes
Alcohol (70 per cent.) .	a sufficient quantity

Prepare 700 millilitres of a tincture by the Percolation Process.

Assay a portion of the tincture by the *biological assay of tincture of digitalis.* To the remainder of the tincture add a sufficient quantity of Alcohol (70 per cent.) to produce a Tincture of Digitalis of the required strength.

2. Preparation from Powdered Digitalis (Digitalis Pulverata).

Powdered Digitalis—A quantity containing 1000 Units of activity, equivalent to 100 grammes of the *international standard digitalis powder.*
Alcohol (70 per cent.), sufficient to produce 1000 millilitres.

Prepare by the Percolation Process.

Alcohol content, 65 to 70 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
0·3 to 1 mil.	5 to 15 minims.
Single Doses	
2 to 6 mils.	30 to 90 minims.

Tincture of Digitalis contains in 6 mils, or in 90 minims, 6 Units of activity.

TINCTURA GENTIANÆ COMPOSITA

[Tinct. Gent. Co.]

Compound Tincture of Gentian

Gentian, cut small and bruised .	100 grammes
Dried Bitter-Orange Peel, bruised	37·5 grammes
Cardamom, bruised . . .	12·5 grammes
Alcohol (45 per cent.) . .	1000 millilitres

Prepare by the Maceration Process.

Alcohol content, 41 to 45 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
2 to 4 mils.	30 to 60 minims.

TINCTURA HYOSCYAMI

[Tinct. Hyoscy.]

Tincture of Hyoscyamus

Tincture of Hyoscyamus contains 0·005 per cent. w/v of the alkaloids of Hyoscyamus, calculated as hyoscyamine (limits, 0·0045 to 0·0055).

Liquid Extract of Hyoscyamus	100 millilitres
Alcohol (70 per cent.), sufficient to produce	1000 millilitres

Mix; set aside for not less than twelve hours; filter.

Assay. Evaporate 250 millilitres at a low temperature to about 10 millilitres. Transfer with 30 millilitres of *chloroform* to a separator, containing a mixture of 10 millilitres of *water* and 3 millilitres of *dilute solution of ammonia*, shake well, allow to separate, and run off the lower layer. Complete the Assay as directed under 'Extractum Hyoscyami Liquidum', commencing with the words 'Continue the extraction with further portions of *chloroform* . . .'.

Alcohol content, 66 to 71 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

Tincture of Hyoscyamus contains in 4 mils. 0·0002 gramme, and in 60 minims about $^1/_{370}$ grain, of the alkaloids of Hyoscyamus, calculated as hyoscyamine.

TINCTURA IPECACUANHÆ

[Tinct. Ipecac.]

Tincture of Ipecacuanha

Tincture of Ipecacuanha contains 0·1 per cent. w/v of the total alkaloids of Ipecacuanha, calculated as emetine (limits, 0·095 to 0·105).

Liquid Extract of Ipecacuanha	50 millilitres
Alcohol (90 per cent.) . .	200 millilitres
Glycerin	200 millilitres
Distilled Water, sufficient to produce	1000 millilitres

Mix the Alcohol (90 per cent.) with the Glycerin and 500 millilitres of Distilled Water; add the Liquid

Extract of Ipecacuanha and sufficient Distilled Water to produce the required volume. Set aside for not less than twenty-four hours; filter.

Assay. To 50 millilitres in a separator add 5 millilitres of *dilute sulphuric acid* and 10 millilitres of *chloroform*, and shake well. Run off the chloroform into a second separator, containing a mixture of 4 millilitres of *alcohol (95 per cent.)* and 20 millilitres of *N/10 sulphuric acid*, shake, allow to separate, and reject the chloroform. Continue the extraction of the liquid in the first separator, with two further quantities of 10 millilitres each of *chloroform*, transferring the chloroform each time to the second separator and washing as before. Transfer the acid liquid from the second separator to the first separator, make distinctly alkaline with *dilute solution of ammonia*, and shake with successive quantities of *chloroform*, until *complete extraction* of the alkaloids is effected, washing each chloroform solution with the same 10 millilitres of *water* contained in another separator. Evaporate the chloroform, add to the residue 2 millilitres of *alcohol (95 per cent.)*, evaporate, and dry for about five minutes at 100°. Dissolve the residue in 5 millilitres of *N/20 sulphuric acid*, and titrate with *N/20 sodium hydroxide*, using *solution of methyl red*, or *tincture of cochineal*, as indicator. Each millilitre of *N/20 sulphuric acid* is equivalent to 0·0120 gramme of total alkaloids, calculated as emetine.

Alcohol content, 20 to 24 per cent. v/v of ethyl alcohol.

Metric.	**DOSES**	**Imperial.**
0·6 to 2 mils.		**10 to 30 minims.**
	Emetic Doses	
15 to 30 mils.		**½ to 1 fluid ounce.**

Tincture of Ipecacuanha contains in 2 mils 0·002 gramme, and in 30 minims about $^1/_{37}$ grain, of the total alkaloids of Ipecacuanha, calculated as emetine.

Tincture of Ipecacuanha replaces Vinum Ipecacuanhæ, Ipecacuanha Wine, of the *British Pharmacopœia*, 1914, and contains the same proportion of alkaloids. When Vinum Ipecacuanhæ or Ipecacuanha Wine is prescribed or demanded Tinctura Ipecacuanhæ shall be dispensed or supplied.

TINCTURA KRAMERIÆ

[Tinct. Kramer.]

Tincture of Krameria

Krameria, in *moderately coarse powder*	200 grammes
Alcohol (60 per cent.), sufficient to produce	1000 millilitres

Prepare by the Percolation Process.

Alcohol content, 55 to 59 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

TINCTURA LIMONIS

[Tinct. Limon.]

Tincture of Lemon

Lemon Peel, in thin slices .	250 grammes
Alcohol (60 per cent.) . .	1000 millilitres

Prepare by the Maceration Process.

Alcohol content, 48 to 54 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

TINCTURA LOBELIÆ ÆTHEREA

[Tinct. Lobel. Æther.]

Ethereal Tincture of Lobelia

Lobelia, in *moderately coarse powder*	200 grammes
Spirit of Ether, sufficient to produce	1000 millilitres

Pack the powder uniformly in a conical percolator, and add sufficient Spirit of Ether to saturate the drug. When liquid begins to drop from the percolator, close the outlet, add sufficient Spirit of Ether to leave a layer above the drug, and allow maceration to continue for twenty-four hours. Allow percolation to proceed slowly, until the percolate measures about 750 millilitres. Press the marc, mix the expressed liquid with the percolate, and add sufficient Spirit of Ether to produce the required volume. Clarify by subsidence, or by filtration.

Alcohol content, 55 to 63 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
0·3 to 1 mil.	**5 to 15 minims.**

TINCTURA MYRRHÆ

[Tinct. Myrrh.]

Tincture of Myrrh

Myrrh, crushed . . .	200 grammes
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Macerate the Myrrh with 800 millilitres of Alcohol (90 per cent.) in a closed vessel for seven days, shaking frequently; filter; pass sufficient Alcohol (90 per cent.) through the filter to produce the required volume.

Alcohol content, 82 to 87 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

TINCTURA NUCIS VOMICÆ

[Tinct. Nuc. Vom.]

Tincture of Nux Vomica

Tincture of Nux Vomica contains 0·125 per cent. w/v of strychnine (limits, 0·119 to 0·131).

Liquid Extract of Nux Vomica	83·4	millilitres
Alcohol (90 per cent.) . .	500	millilitres
Distilled Water, sufficient to produce	1000	millilitres

Mix; filter, if necessary.

Assay. Evaporate 100 millilitres on a water-bath to about 10 millilitres, and complete the Assay as directed under 'Nux Vomica', commencing with the words 'add 5 millilitres of alcohol (*95 per cent.*), 10 millilitres of *N/1 sulphuric acid* . . .'.

Alcohol content, 47 to 50 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
0·6 to 2 mils.	**10 to 30 minims.**

Tincture of Nux Vomica contains in 2 mils 0·0025 gramme, and in 30 minims about $^1/_{30}$ grain, of strychnine.

TINCTURA OPII

[Tinct. Opii]

Tincture of Opium

Synonym. Laudanum.

Tincture of Opium contains 1 per cent. w/v of morphine, calculated as anhydrous morphine (limits, 0·95 to 1·05).

Opium, sliced	200 grammes
Alcohol (90 per cent.) Distilled Water	of each, a sufficient quantity

Pour 500 millilitres of boiling Distilled Water on to the Opium, and set aside for six hours; add 500 millilitres of Alcohol (90 per cent.), mix thoroughly, and set aside in a covered vessel for twenty-four hours; strain, press the marc, mix the liquids, and set aside for not less than twenty-four hours; filter.

Determine the proportion of morphine, calculated as anhydrous morphine, in the tincture so prepared, by the Assay described below, using 40 millilitres. To the remainder of the liquid add sufficient of a mixture of equal volumes of Alcohol (90 per cent.) and Distilled Water to produce a Tincture of Opium of the required strength.

Assay. Evaporate 80 millilitres nearly to dryness, and triturate the residue with 5 millilitres of *water*, until a uniform mixture is produced. Add a further 20 millilitres of *water* and 2 grammes of *calcium hydroxide*, and again mix very thoroughly. Transfer the mixture to a tared flask, rinsing the dish with portions of water sufficient to produce 86 grammes, and complete the Assay as directed under 'Opium', commencing with the words 'Stopper the flask and shake occasionally . . .'; 52 millilitres of the filtrate represents 50 millilitres of the tincture of opium being assayed.

Alcohol content, 41 to 46 per cent v/v of ethyl alcohol.

Preparation. Tinctura Opii Camphorata.

DOSES

Metric.	Imperial.
0·3 to 2 mils.	5 to 30 minims.

Tincture of Opium contains in 2 mils 0·02 gramme, and in 30 minims about $^1/_3$ grain, of morphine, calculated as anhydrous morphine.

TINCTURA OPII CAMPHORATA

[Tinct. Opii Camph.]

Camphorated Tincture of Opium

Synonyms. Tinctura opii benzoica I.A.: Tinctura Camphoræ Composita : Compound Tincture of Camphor: Paregoric.

Camphorated Tincture of Opium contains 0·05 per cent. w/v of morphine, calculated as anhydrous morphine (limits, 0·045 to 0·055).

Tincture of Opium . . .	50 millilitres
Benzoic Acid	5 grammes
Camphor	3 grammes
Oil of Anise	3 millilitres
Alcohol (60 per cent.), sufficient to produce	1000 millilitres

Dissolve the Benzoic Acid, Camphor, and Oil of Anise in 900 millilitres of Alcohol (60 per cent.); add the Tincture of Opium and sufficient Alcohol (60 per cent.) to produce the required volume; filter, if necessary.

Assay. Evaporate 10 millilitres to dryness, extract the residue with 5 millilitres of *solution of calcium hydroxide*, filter into a separator, and wash the dish and filter with about 10 millilitres of *solution of calcium hydroxide*. Extract the filtrate with two successive quantities of 10 millilitres of *ether*, wash the mixed ethereal solutions with 5 millilitres of *solution of calcium hydroxide*, followed by 5 millilitres of *water*, and reject the ether. To the mixed alkaline liquids add 0·15 gramme of *ammonium sulphate* and sufficient *water* to produce 30 millilitres; add 30 millilitres of *alcohol* (*95 per cent.*) and 30 millilitres of *chloroform*, and shake well. Run off the lower layer into a second separator, and wash it with a mixture of 5 millilitres of *alcohol* (*95 per cent.*) and 10 millilitres of *water*. Continue the extraction of the liquid in the first separator with two successive quantities of a mixture of 15 millilitres of *alcohol* (*95 per cent.*) and 30 millilitres of *chloroform*, washing each alcohol-chloroform solution with the same liquid as before. Evaporate the mixed alcohol-chloroform solutions to dryness, dissolve the residue in 25 millilitres of *N/1 hydrochloric acid*, and dilute with *water* to 250 millilitres. To 20 millilitres of this solution, representing 0·8 millilitre of the camphorated tincture of opium being assayed, add 8 millilitres of a 1 per cent. w/v solution of *sodium nitrite* and 12 millilitres of *dilute solution of ammonia*; a yellowish-brown colour is produced. Determine the volume of a 0·002 per cent. w/v solution of anhydrous morphine in *N/10 hydrochloric acid* required to produce an equal depth of colour, when treated with *sodium nitrite* and *dilute solution of ammonia* in the same manner.

Alcohol content, 56 to 60 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

Camphorated Tincture of Opium contains in 4 mils 0·002 gramme, and in 60 minims about 1/37 grain, of morphine, calculated as anhydrous morphine.

TINCTURA QUASSIÆ

[Tinct. Quass.]

Tincture of Quassia

Quassia, rasped . . .	100 grammes
Alcohol (45 per cent.) . .	1000 millilitres

Prepare by the Maceration Process.

Alcohol content, 43 to 45 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

TINCTURA QUILLAIÆ

[Tinct. Quill.]

Tincture of Quillaia

Quillaia, in *moderately coarse powder*	50 grammes
Alcohol (45 per cent.), sufficient to produce	1000 millilitres

Prepare by the Percolation Process.

Alcohol content, 43 to 45 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

TINCTURA RHEI COMPOSITA

[Tinct. Rhei Co.]

Compound Tincture of Rhubarb

Rhubarb, in *moderately coarse powder*	100 grammes
Cardamom, in *moderately coarse powder*	12·5 grammes
Coriander, in *moderately coarse powder*	12·5 grammes
Glycerin	100 millilitres
Alcohol (60 per cent.), sufficient to produce	1000 millilitres

Moisten the mixed powders with a sufficient quantity of Alcohol (60 per cent.), and prepare 850 millilitres of tincture by the Percolation Process. Add the Glycerin and sufficient Alcohol (60 per cent.) to produce the required volume. Filter, if necessary.

Alcohol content, 48 to 53 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

TINCTURA SCILLÆ

[Tinct. Scill.]

Tincture of Squill

Tincture of Squill contains active constituents approximately equivalent to 10 per cent. w/v of Squill.

Squill, bruised	100 grammes
Alcohol (60 per cent.) . .	1000 millilitres

Prepare by the Maceration Process.

Alcohol content, 52 to 57 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
0·3 to 2 mils.	**5 to 30 minims.**

TINCTURA SENEGÆ

[Tinct. Seneg.]

Tincture of Senega

Liquid Extract of Senega . .	200 millilitres
Alcohol (60 per cent.), sufficient to produce	1000 millilitres

Mix. Set aside for not less than twelve hours; filter.

Alcohol content, 57 to 60 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

TINCTURA STRAMONII

[Tinct. Stramon.]

Tincture of Stramonium

Tincture of Stramonium contains 0·025 per cent. w/v of the alkaloids of Stramonium, calculated as hyoscyamine (limits, 0·0225 to 0·0275).

Stramonium, in *moderately coarse powder*	200 grammes
Alcohol (45 per cent.)	. a sufficient quantity

Prepare 1000 millilitres of a tincture by the Percolation Process. Determine the proportion of alkaloids in this tincture by the Assay described below, and add, if necessary, sufficient Alcohol (45 per cent.) to produce a Tincture of Stramonium of the required strength.

Assay. Carry out the Assay as directed under 'Tinctura Belladonnæ'. Each millilitre of *N/50 sulphuric acid* is equivalent to 0·005784 gramme of hyoscyamine.

Alcohol content, 40 to 45 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
0·3 to 2 mils.	5 to 30 minims.

Tincture of Stramonium contains in 2 mils 0·0005 gramme, and in 30 minims about $^1/_{120}$ grain, of the alkaloids of Stramonium, calculated as hyoscyamine.

Tincture of Stramonium is of approximately half the strength of the corresponding preparation of the British Pharmacopœia, 1914.

TINCTURA STROPHANTHI

[Tinct. Strophanth.]

Tincture of Strophanthus

CAUTION.—In any part of the British Empire in which Tincture of Strophanthus is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Tincture of Strophanthus possesses a degree of activity equivalent to that of the *standard tincture of strophanthus.*

Strophanthus, in *moderately coarse powder*, dried at 45° . .	100 grammes
Alcohol (70 per cent.)	. a sufficient quantity

Pack the powder in a percolator; moisten with *light petroleum (boiling-point, 50° to 60°)*, and macerate for twenty-four hours; allow percolation to proceed, continuing the addition of *light petroleum (boiling-point, 50° to 60°)*, until the liquid passes through colourless. Reject the percolate, remove the marc from the percolator, and dry it by exposure to air, finishing the drying, if necessary, in a current of air at a temperature not exceeding 40°. Again reduce it to powder, repack in the percolator, and moisten with Alcohol (70 per cent.). Macerate for forty-eight hours, then pour on successive quantities of Alcohol (70 per cent.), percolating slowly, until 500 millilitres of the percolate are obtained.

Assay a portion of the percolate by the *biological assay of tincture of strophanthus.* To the remainder of the percolate add sufficient Alcohol (70 per cent.) to produce a Tincture of Strophanthus of the required degree of activity.

Alcohol content, 67 to 70 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
0·12 to 0·3 mil.	**2 to 5 minims.**

TINCTURA TOLUTANA

[Tinct. Tolu.]

Tincture of Tolu

Synonym. Tincture of Balsam of Tolu.

Balsam of Tolu	100 grammes
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Dissolve the Balsam of Tolu in 800 millilitres of Alcohol (90 per cent.); filter, and pass sufficient Alcohol (90 per cent.) through the filter to produce the required volume.

Alcohol content, 80 to 84 per cent. v/v of ethyl alcohol.

DOSES

Metric.	**Imperial.**
2 to 4 mils.	**30 to 60 minims.**

TINCTURA VALERIANÆ AMMONIATA

[Tinct. Valerian. Ammon.]

Ammoniated Tincture of Valerian

Valerian, in *moderately coarse powder*	200 grammes
Oil of Nutmeg	3 millilitres
Oil of Lemon	2 millilitres
Dilute Solution of Ammonia	100 millilitres
Alcohol (60 per cent.)	900 millilitres

Mix the liquid ingredients, and prepare by the Maceration Process.

Alcohol content, 50 to 54 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
2 to 4 mils.	30 to 60 minims.

TINCTURA ZINGIBERIS FORTIS

[Tinct. Zingib. Fort.]

Strong Tincture of Ginger

Synonym. Essence of Ginger.

Ginger, in *moderately coarse powder*	500 grammes
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Prepare by the Percolation Process.

Alcohol content, 82 to 88 per cent. v/v of ethyl alcohol.

Preparations. Tinctura Zingiberis Mitis.
Syrupus Zingiberis.

DOSES

Metric.	Imperial.
0·3 to 0·6 mil.	5 to 10 minims.

TINCTURA ZINGIBERIS MITIS

[Tinct. Zingib. Mit.]

Weak Tincture of Ginger

Synonyms. Tinctura Zingiberis: Tincture of Ginger.

Strong Tincture of Ginger .	200 millilitres
Alcohol (90 per cent.), sufficient to produce	1000 millilitres

Mix. Filter, if necessary.

Alcohol content, 88 to 90 per cent. v/v of ethyl alcohol.

DOSES

Metric.	Imperial.
2 to 4 mils.	30 to 60 minims.

TOTAQUINA

[Totaquin.]

Totaquine

Totaquine is a mixture of alkaloids from the bark of *Cinchona succirubra* Pavon, *Cinchona robusta* Howard, and other suitable species of *Cinchona*. It contains not less than 70 per cent. of crystallisable cinchona alkaloids, of which not less than one-fifth is quinine.

Characters. A nearly colourless, or pale yellowish-grey, or pale brown powder; odourless; taste, bitter.

Almost insoluble in cold *water*; almost completely soluble in warm *alcohol (95 per cent.)*; partially soluble in *ether*; almost completely soluble in *chloroform*; partially soluble in *benzene,* and in *light petroleum (boiling-point, 50° to 60°).*

A solution in *alcohol (95 per cent.)* is alkaline to *litmus.*

Tests for Identity. Heated in a dry test-tube, it gradually chars and gives off a strongly alkaline vapour.

A 0·1 per cent. w/v aqueous solution, prepared with the aid of the minimum amount of *dilute sulphuric acid,* shows a blue fluorescence.

To 5 millilitres of a 0·1 per cent. w/v aqueous solution, prepared with the aid of the minimum amount of *dilute sulphuric acid,* add *solution of bromine* until a faint yellow colour is produced, and then 1 millilitre of *dilute solution of ammonia;* an emerald-green colour is produced.

Tests for Purity. 0·5 gramme, when dried first at 70° for one hour, and finally at 100°, loses not more than 0·025 gramme; and leaves, on incineration, not more than 0·025 gramme of residue.

Assay. *For quinine and total crystallisable alkaloids.* Dissolve 2 grammes in a mixture of 20 millilitres of *N/1 sulphuric acid*, 40 millilitres of *water* and 40 millilitres of *alcohol (95 per cent.)*. Heat to boiling, and add *N/10 sodium hydroxide*, keeping the liquid hot during the addition, until the solution is just faintly alkaline to *litmus*. Cool, add *N/10 sulphuric acid* drop by drop, until the solution is slightly acid to *litmus*. Boil for one or two minutes, cool and, if necessary, again render slightly acid to *litmus*; boil, and filter into a tared flask. Wash out the original vessel and the filter with boiling *water*, until *complete extraction* of the alkaloids is effected, adding the washings to the original filtrate. Evaporate the filtrate, until it weighs about 120 grammes. Add 30 grammes of powdered *sodium potassium tartrate*, shake until dissolved, and set aside for twenty-four hours. Filter off the precipitate through a hardened filter, and wash the flask and filter with 80 millilitres of a 25 per cent. w/v solution of *sodium potassium tartrate* in *water*, added in portions. Reserve the filtrate and washings. Return the filter with the precipitate to the flask, add 40 millilitres of *solution of sodium hydroxide* and 80 millilitres of *chloroform*, and set aside, shaking from time to time, until complete solution is effected. Separate the chloroform solution, and wash the flask and the aqueous liquid with further portions of *chloroform*, until *complete extraction* of the alkaloids is effected. Wash the mixed chloroform solutions with a little *water*. Remove the chloroform, add 5 millilitres of *alcohol (95 per cent.)*, and evaporate. Dry the residue at 100°, and weigh the residue of quinine and cinchonidine.

Determine the proportion of quinine in the mixture of the two alkaloids by a *determination of methoxyl*, using 0·2 gramme. 1 per cent. of methoxyl is equivalent to 10·45 per cent. of anhydrous quinine.

Run the filtrate and washings from the precipitated tartrates into a separator, containing 80 millilitres of *ether* and 20 millilitres of *solution of sodium hydroxide*, and shake. Run off the aqueous layer into a second separator, and shake it with two further quantities of 80 millilitres of *ether*, each quantity of ether being returned to the first separator. Wash the mixed ethereal solutions with a little *water*, and extract the alkaloids by shaking with successive quantities of 10, 10 and 5 millilitres of *N/1 sulphuric acid*, and finally with 10 millilitres of *water*. Run the mixed acid and aqueous liquids into a separator, containing 25 millilitres of *ether* and 30 millilitres of *N/1 sodium hydroxide*, shake, and set aside for one hour.

Collect the precipitated cinchonine on a tared filter, using a little *water* to facilitate the complete transfer of the precipitate to the filter; separate the ether from the filtrate, and again run the ether through the precipitate on the filter. Shake the aqueous liquid again with two separate quantities of 25 millilitres of *ether*, and use these ethereal washings to wash the precipitate. Dry the precipitate at 100°, and weigh the residue of cinchonine. To the weight obtained add 0·08 gramme, in order to correct for loss of cinchonine due to its solubility in ether.

Run the ethereal filtrate from the cinchonine into a separator; wash out the filter-flask with a little *water* and *ether*, and add the washings to the liquid in the separator. Separate the aqueous layer, and extract the alkaloid from the ethereal solution by shaking with successive quantities of 10, 10, 5 and 5 millilitres of a 10 per cent. w/w aqueous solution of *glacial acetic acid*, which have been previously used to wash out any alkaloid, remaining in the filter-flask or the stem of the funnel. Heat the mixed acetic acid solutions to the boiling-point, neutralise with *dilute solution of ammonia*, and add 5 grammes of *potassium iodide*. Allow to stand overnight, and decant the clear supernatant liquid through a filter, warm the precipitate with 5 millilitres of *alcohol (50 per cent.)*, filter off the liquid, and wash the crystalline residue on to the filter with 5 millilitres of *alcohol (50 per cent.)*. Dry the precipitate at 100°, and weigh the residue of quinidine hydriodide. To the weight obtained add 0·008 gramme, in order to correct for loss of quinidine hydriodide due to its solubility. Each gramme of quinidine hydriodide is equivalent to 0·717 gramme of quinidine.

The sum of the percentages of quinine, cinchonidine, cinchonine and quinidine gives the percentage of crystallisable alkaloids.

DOSES

Metric.	Imperial.
0·06 to 0·6 gramme.	1 to 10 grains.

TOXINUM DIPHTHERICUM CALEFACTUM

[Toxin. Diphtheric. Calefact.]

Schick Control

CAUTION.—In any part of the British Empire in which Schick Control is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Schick Control is Schick Test Toxin, which has been heated to a temperature of not less than 70° for not less than five minutes. It is prepared from the same batch of Schick Test Toxin as that with which it is issued for use. A skin reaction due to the injection of Schick Test Toxin may be due either to the specific toxin, or to non-specific substances present. In observing the effect of an injection of Schick Test Toxin, an injection of the corresponding Schick Control is always given simultaneously, in order to exclude reactions due to non-specific substances.

Tests for Purity. It complies with the *tests for sterility.*

DOSE

Metric.	**Imperial.**
By intradermal injection.	
0·2 mil.	**3 minims.**

TOXINUM DIPHTHERICUM DETOXICATUM

[Toxin. Diphtheric. Detoxicat.]

Diphtheria Prophylactic

CAUTION.—In any part of the British Empire in which Diphtheria Prophylactic is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Diphtheria Prophylactic is the sterile filtrate, or material derived from a filtrate, of a culture on nutrient broth of *Corynebacterium diphtheriæ*. The specific toxicity of the filtrate is reduced to a low value, ~~but not so low as to render it inefficient as an immunising antigen~~, then an ap

Diphtheria Prophylactic may occur in the following, and in other, forms :—

(*a*) Diphtheria Toxin-Antitoxin Mixture, a clear, faintly yellow or colourless liquid, prepared by adding Diphtheria Antitoxin to the filtrate.

(a) (*b*) Diphtheria Toxoid or Anatoxin, a clear, faintly yellow or colourless liquid, prepared by treating the filtrate with formaldehyde untill the toxicity has been completely remov

(*c*) Diphtheria Toxoid-Antitoxin Mixture, a clear, faintly yellow or colourless liquid, prepared by ~~treating the filtrate~~

with formaldehyde, and adding a small quantity of Diphtheria Antitoxin.

(*d*) Diphtheria Toxin-Antitoxin Floccules, a fine suspension of white particles in a colourless liquid, prepared by adding Diphtheria Antitoxin to the filtrate in the proportion necessary to produce a suitable flocculation, separating the floccules, and washing and suspending them in Physiological Solution of Sodium Chloride.

(*e*) Diphtheria Toxoid-Antitoxin Floccules, a fine suspension of white particles in a colourless liquid, prepared by treating the filtrate with formaldehyde, adding Diphtheria Antitoxin in the proportion 80% of toxoid necessary to produce a suitable flocculation, separating the floccules, and washing and suspending them in Physiological Solution of Sodium Chloride. words of Abbreviations are used. Formol Toxoid (F.T) Toxoid Anti Toxin (T.A.M) or (T.A.F).

Test for Identity. It confers on guinea-pigs an active immunity, as tested by observing the effect of injecting into the skin A more ~~one~~ Test Doses of Schick Test Toxin..

Tests for Purity. Complies with the *tests for sterility.*

Assay. It is submitted to two tests. Test I ensures that the specific toxicity has been sufficiently reduced. Test II ensures that the potency, as an immunising antigen, has been preserved.

Test I. Five c.c. ~~times the volume indicated as the adult dose~~, injected subcutaneously into each of five normal guinea-pigs, weighing between 250 and 350 grammes, does not cause the death of any of the guinea-pigs during the following 30 ~~six~~ days. If all the guinea-pigs injected survive for six days, but any of them die from the specific toxæmia within thirty days following the injection, the following additional test must be applied:—~~the volume indicated as the adult dose~~, injected subcutaneously into each of five normal guinea-pigs, weighing from 250 to 350 grammes, must not cause the death of any of the guinea-pigs during the following thirty days.

Test II. A quantity not exceeding five times the volume indicated as the adult dose injected under the skin on one occasion, or one-tenth of the volume indicated as the adult dose injected under the skin on two occasions, which are separated by an interval of not more than four weeks, into each of ten normal guinea-pigs, gives them a degree of immunity indicated by the result of either of the following methods of examination:—

(1) One test dose of Schick Test Toxin is injected into the skin of each of the ten guinea-pigs; a 'positive Schick reaction' must not occur in more than two of the animals.

(2) Five lethal doses of Diphtheria Toxin are injected under the skin of each of the ten guinea-pigs; not more than two of the guinea-pigs die as a result of the injection.

This examination is made at about the sixth week after the single injection, or at about the third week after the second of the two injections.

Storage. In the form of Toxin-Antitoxin Mixture, Diphtheria Prophylactic may become dangerously toxic when stored below 0°; but when stored at a temperature from 0° to 10°, it retains its specific properties for eighteen months. In the form of undiluted toxoid, it is stable at room temperature for at least two years.

Containers. It is distributed in sterilised glass containers, sealed so as to exclude bacteria. If more than one dose is included in one container, and, if the container allows the withdrawal of successive doses on different occasions, the Diphtheria Prophylactic contains a suitable antiseptic, in such concentration as will prevent the growth of bacteria, ~~at least as effectively as 0·5 per cent. w/v of Phenol~~.

uirements applicable to different forms Diphtheri

See Note Book

DOSE

By subcutaneous injection.

The volume indicated on the label as the dose, on two or three occasions, at intervals of two to four weeks.

TOXINUM DIPHTHERICUM DIAGNOSTICUM

[Toxin. Diphtheric. Diagnost.]

Schick Test Toxin

CAUTION.—In any part of the British Empire in which Schick Test Toxin is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Schick Test Toxin is a reagent used for the diagnosis of susceptibility to diphtheria.

It is obtained by preparing a sterile filtrate from a culture on nutrient broth of *Corynebacterium diphtheriæ*, which, after being allowed to mature, is diluted before use so that 0·2 millilitre contains the Test Dose. The sterile filtrate may be diluted with a sterile solution of Sodium Chloride, so that the diluted liquid is isotonic with blood; or with a sterile aqueous solution, containing

1·5 per cent. w/v of a mixture of 57 grammes of Borax, 85 grammes of Boric Acid, and 99 grammes of Sodium Chloride; or with some other solution, which will equally well stabilise the hydrogen-ion concentration, and render the mixture isotonic with blood.

It is distributed in the diluted or undiluted forms in sterile containers, which are sealed so as to exclude bacteria. If it is not diluted, each sealed container holding Schick Test Toxin is accompanied by a separate container of a sterile solution of Sodium Chloride which, when mixed with the Schick Test Toxin, will yield a solution isotonic with blood, and containing one Test Dose in 0·2 millilitre.

Characters. The undiluted form is a yellow liquid, free from particles; the diluted form is a clear, colourless liquid.

Test for Identity. Causes a local reaction, when injected into the skin of a normal guinea-pig, but fails to cause this reaction, when mixed, before injection, with a sufficient quantity of Diphtheria Antitoxin.

Tests for Purity. Complies with the *tests for sterility.*

Assay. The Test Dose is measured by the two following tests, and complies with both:—

(i) By injecting into the skin of normal guinea-pigs mixtures of Schick Test Toxin with different proportions of Diphtheria Antitoxin. One Test Dose, mixed with 1/1250th, or less, of 1 *Unit of Diphtheria Antitoxin,* causes a local reaction of the kind known as a 'positive Schick reaction', but, mixed with 1/750th, or more, of 1 *Unit of Diphtheria Antitoxin,* causes no local reaction of any kind.

(ii) By injecting Schick Test Toxin into the skin of normal guinea-pigs. 1/25th of one Test Dose causes, but 1/50th of one Test Dose does not cause, a local reaction of the kind known as a 'positive Schick reaction'. Smaller quantity pro

Storage. Schick Test Toxin, if undiluted and stored at a temperature not exceeding 10°, retains its potency for six months. If diluted with the solution of Sodium Chloride alone, it is very unstable, losing its potency in a few days, even when stored in an ice chest. If diluted with the solution of Borax, Boric Acid and Sodium Chloride, described above, and stored at a temperature not exceeding 25°, it retains its potency for at least two months.

DOSE. Preparation: Toxinum

Metric. **Imperial.**
By intradermal injection.
0·2 mil. **3 minims.**

TRAGACANTHA

[Trag.]

Tragacanth

Tragacanth is the dried gummy exudation, obtained by incision from *Astragalus gummifer* Labill. and some other species of *Astragalus*, and is known in commerce as Persian tragacanth. It contains not more than 2 per cent. of other organic matter.

Characters. Thin flattened flakes, irregularly oblong or more or less curved, marked on the surface by concentric ridges, frequently about 2·5 centimetres long and 12 millimetres wide; white or pale yellowish-white, somewhat translucent; horny; fracture, short. Sparingly soluble in water, but swelling into a homogeneous, adhesive, gelatinous mass, which is coloured yellow and may show minute, scattered blue points, when treated with *N/50 iodine*; when examined microscopically only a few groups of small rounded starch grains are visible. Odourless; almost tasteless.

Tests for Purity. When powdered, it does not acquire a pink colour in *solution of ruthenium red* (absence of sterculia gum).

Ash, not more than 4 per cent.

Preparations. Mucilago Tragacanthæ.
Pulvis Tragacanthæ Compositus.

TRINITROPHENOL

[Trinitrophen.]

Trinitrophenol

Synonyms. Acidum Picricum : Picric Acid.

$C_6H_2(OH)(NO_2)_3$ $[OH : (NO_2)_3 = 1 : 2 : 4 : 6]$
Mol. Wt. 229·0

Trinitrophenol may be obtained by treating phenol with sulphuric acid at a suitable temperature, and by treating the product with nitric acid. It contains not less than 99 per cent. of $C_6H_3O_7N_3$.

Characters. A bright yellow, crystalline powder; odourless; taste, very bitter. Explodes, when heated rapidly, or subjected to percussion.

Soluble in about 90 parts of *water*, and in about 10 parts of *alcohol* (*90 per cent.*).

Tests for Identity and Purity. An aqueous solution is intensely yellow, and is acid to *litmus*.

Melting-point, 121° to 123° (when taking the melting-point the operator should be protected by a glass screen).

Leaves, on extraction with *benzene* at 50°, not more than 0·1 per cent. of residue.

Dissolve 2·5 grammes in 50 millilitres of boiling *water*, containing 1 millilitre of *hydrochloric acid*. Cool, and filter; 40 millilitres of the filtrate complies with the *limit test for sulphates*.

Assay. Dissolve 2 grammes in hot *water*, and titrate with *N/2 sodium hydroxide*, using *solution of phenolphthalein* as indicator. Each millilitre of *N/2 sodium hydroxide* is equivalent to 0·1145 gramme of $C_6H_3O_7N_3$.

Storage. Trinitrophenol, for safety, may be mixed with an equal weight of water. If so mixed, it should be dried over sulphuric acid before the foregoing tests are applied.

DOSES

Metric.	**Imperial.**
0·06 to 0·3 gramme.	**1 to 5 grains.**

TROCHISCI

Lozenges

GENERAL PROCESS

Take one thousand times the quantity of the drug ordered for one lozenge; dissolve such salts of alkaloids as may be ordered in 20 millilitres, or a sufficient quantity, of Distilled Water; mix the solution with 1000 grammes of Sucrose and 70 grammes of Acacia, both finely powdered. Incorporate 20 millilitres of Tincture of Tolu, and any other drugs ordered for the lozenges. Make into a paste with a sufficient quantity of Distilled Water; divide into 1000 equal lozenges, and dry in a hot-air chamber at a moderate temperature.

TROCHISCUS ACIDI TANNICI

[Troch. Acid. Tann.]

Lozenge of Tannic Acid

Synonym. Tannic Acid Lozenge.

Tannic Acid	30 grammes

Prepare 1000 lozenges by the General Process.

Each Lozenge of Tannic Acid contains approximately 0·03 gramme, or $^{1}/_{2}$ grain, of Tannic Acid.

TROCHISCUS BISMUTHI COMPOSITUS

[Troch. Bism. Co.]

Compound Lozenge of Bismuth

Synonym. Compound Bismuth Lozenge.

Bismuth Carbonate . . .	150	grammes
Heavy Magnesium Carbonate .	150	grammes
Calcium Carbonate . . .	300	grammes
Acacia, finely powdered . .	70	grammes
Sucrose, finely powdered . .	1000	grammes
Oil of rose, of commerce . .	0·05	millilitre
Distilled Water . .	a sufficient quantity	

Mix the powders, and add the oil of rose. Make the mixture into a paste with a sufficient quantity of Distilled Water; divide into 1000 equal lozenges, and dry in a hot-air chamber at a moderate temperature.

Each Compound Lozenge of Bismuth contains approximately 0·15 gramme, or $2^{1}/_{4}$ grains, of Bismuth Carbonate.

TROCHISCUS KRAMERIÆ

[Troch. Kramer.]

Lozenge of Krameria

Synonym. Krameria Lozenge.

Dry Extract of Krameria, finely powdered	60 grammes

Prepare 1000 lozenges by the General Process.

Each Lozenge of Krameria contains approximately 0·06 gramme, or 1 grain, of Dry Extract of Krameria.

TROCHISCUS KRAMERIÆ ET COCAINÆ

[Troch. Kramer. et Cocain.]

Lozenge of Krameria and Cocaine

Synonym. Krameria and Cocaine Lozenge.

Dry Extract of Krameria, finely powdered	60 grammes
Cocaine Hydrochloride	3 grammes

Prepare 1000 lozenges by the General Process.

Each Lozenge of Krameria and Cocaine contains approximately 0·06 gramme, or 1 grain, of Dry Extract of Krameria, and approximately 0·003 gramme, or $^1/_{20}$ grain, of Cocaine Hydrochloride.

TROCHISCUS MORPHINÆ ET IPECACUANHÆ

[Troch. Morph. et Ipecac.]

Lozenge of Morphine and Ipecacuanha

Synonym. Morphine and Ipecacuanha Lozenge.

Morphine Hydrochloride	2 grammes
Powdered Ipecacuanha	6 grammes

Prepare 1000 lozenges by the General Process.

Each Lozenge of Morphine and Ipecacuanha contains approximately 0·002 gramme, or $^1/_{32}$ grain, of Morphine Hydrochloride, and approximately 0·006 gramme, or $^1/_{10}$ grain, of Ipecacuanha.

TROCHISCUS PHENOLIS

[Troch. Phenol.]

Lozenge of Phenol

Synonyms. Trochiscus Acidi Carbolici: Phenol Lozenge: Carbolic Acid Lozenge.

Liquefied Phenol	35·5 millilitres
Acacia, finely powdered	90 grammes
Tragacanth, finely powdered	30 grammes
Citric Acid, finely powdered	7 grammes
Carmine, of commerce	3 grammes
Sucrose, finely powdered	1000 grammes
Distilled Water	a sufficient quantity

Mix to form a paste. Divide into 1000 equal lozenges, and dry in a hot-air chamber at a moderate temperature.

Storage. Lozenge of Phenol should be kept in a well-closed container, protected from light, and stored in a cool place.

Each Lozenge of Phenol contains approximately 0·03 gramme, or $^1/_2$ grain, of Phenol.

TUBERCULINUM PRISTINUM

[Tuberculin. Prist.]

Old Tuberculin

CAUTION.—In any part of the British Empire in which Old Tuberculin is controlled by law, care must be taken that the provisions of such law are duly complied with. (*See page 12.*)

Old Tuberculin is the concentrated filtrate from a fluid medium on which *Bacillus tuberculosis* has been grown. The bacillus is grown on a fluid medium, containing 5 per cent. of Glycerin, at approximately 37° for a period of six weeks, or more. The growth should be rapid and abundant. The fluid medium, from which the bacilli may or may not have been previously separated by filtration, is concentrated by evaporation on a water-bath to one-tenth of its original volume, and clarified by filtration. If the required test, for potency shows that the preparation, so concentrated, is more potent than the *standard preparation*, the potency may be reduced by appropriate dilution with a 50 per cent. v/v aqueous solution of Glycerin. If the test shows that the potency is less than that of the *standard preparation*, the preparation is rejected. The final sterile product is distributed in sterilised glass phials, which are sealed so as to exclude bacteria.

Characters. A transparent, viscous fluid, yellow to brown in colour; odour, like that of honey.

Test for Identity. It possesses a specific toxicity for animals, infected with the ~~*Bacillus*~~ *tuberculosis.* Mycobacterium

Tests for ~~Purity~~ [illegible] When 0·5 millilitre is injected under the skin of a normal guinea-pig, it does not produce serious symptoms, or death.

Complies with the *tests for sterility.*

Assay. Determine the potency by the *biological assay of old tuberculin.*

Storage. Old Tuberculin, if undiluted, is stable at ordinary temperatures; but if diluted, it is unstable and deteriorates at a rate which depends on the temperature.

DOSES

Metric.	**Imperial.**
By subcutaneous injection.	
Diagnostic.	
0·001 to 0·005 mil.	**$^1/_{60}$ to $^1/_{12}$ minim.**
Therapeutic.	
0·000001 mil, gradually increased.	**$^1/_{60,000}$ minim, gradually increased.**

When Old Tuberculin is prescribed with a suffix T, the Old Tuberculin dispensed is prepared by growing the human type of bacilli. When the Old Tuberculin is prescribed with a suffix PT, the Old Tuberculin dispensed is prepared by growing the bovine type of bacilli.

UNGUENTUM ACIDI BORICI

[Ung. Acid. Boric.]

Ointment of Boric Acid

Synonym. Boric Acid Ointment.

Boric Acid, finely sifted . .	100 grammes
Paraffin Ointment, white . .	900 grammes

Melt the Paraffin Ointment; sift in the Boric Acid; stir, until cold.

UNGUENTUM ACIDI SALICYLICI

[Ung. Acid. Salicyl.]

Ointment of Salicylic Acid

Synonym. Salicylic Acid Ointment.

Salicylic Acid, finely sifted .	20 grammes
Paraffin Ointment, white . .	980 grammes

Melt the Paraffin Ointment; add the Salicylic Acid; stir, until cold.

UNGUENTUM ACIDI TANNICI

[Ung. Acid. Tann.]

Ointment of Tannic Acid

Synonym. Tannic Acid Ointment.

Tannic Acid	200 grammes
Glycerin	200 grammes
Yellow Beeswax	120 grammes
Benzoinated Lard	480 grammes

Dissolve the Tannic Acid in the Glycerin with the aid of gentle heat. Melt the Yellow Beeswax; add the Benzoinated Lard, heat gently until melted, stir until cool, and incorporate the solution of Tannic Acid.

UNGUENTUM AQUOSUM

[Ung. Aquos.]

Hydrous Ointment

Distilled Water	240 millilitres
Borax	10 grammes
White Beeswax	125 grammes
White Soft Paraffin	125 grammes
Olive Oil	500 millilitres

Melt the White Beeswax and the White Soft Paraffin with the Olive Oil; and dissolve the Borax in the Distilled Water by the aid of heat. When both liquids are at about the same temperature, add the aqueous solution gradually to the oily liquid, and stir, until cold.

UNGUENTUM CAPSICI

[Ung. Capsic.]

Ointment of Capsicum

Synonym. Capsicum Ointment.

Capsicum, bruised	250 grammes
Lard	100 grammes
Hard Paraffin	100 grammes
Yellow Soft Paraffin	750 grammes

Digest on a water-bath for one hour, stirring occasionally; strain; stir, until cold.

UNGUENTUM CHRYSAROBINI

[Ung. Chrysarob.]

Ointment of Chrysarobin

Synonym. Chrysarobin Ointment.

Chrysarobin, finely sifted	40 grammes
Simple Ointment	960 grammes

Triturate the Chrysarobin with a portion of the Simple Ointment, until smooth; gradually add the remainder, mixing thoroughly by trituration.

UNGUENTUM HYDRARGYRI

[Ung. Hydrarg.]

Ointment of Mercury

Synonym. Mercury Ointment.

Ointment of Mercury contains 30 per cent. of Mercury (limits, 29 to 31).

Mercury	300 grammes
Suet	50 grammes
Benzoinated Lard	650 grammes

Triturate the Mercury with the Suet and 50 grammes of the Benzoinated Lard, until metallic globules cease to be visible when examined under a lens magnifying four diameters; incorporate the remainder of the Benzoinated Lard.

Assay. Boil gently for five minutes about 1 gramme, accurately weighed, in 10 millilitres of *nitric acid* and 25 millilitres of *water*; cool, and dilute with 25 millilitres of *water*. Decant the acid solution on to a moistened filter paper, filter, and wash the melted fat several times with small quantities of hot *water*. To the warm mixture of filtrate and washings add sufficient *solution of potassium permanganate* to produce a permanent pink colour. Decolourise by the addition of a trace of *ferrous sulphate*, and titrate with *N/10 ammonium thiocyanate*, using *solution of ferric ammonium sulphate* as indicator. Each millilitre of *N/10 ammonium thiocyanate* is equivalent to 0·01003 gramme of Hg.

Preparation. Unguentum Hydrargyri Compositum.

UNGUENTUM HYDRARGYRI AMMONIATI

[Ung. Hydrarg. Ammon.]

Ointment of Ammoniated Mercury

Synonyms. Ammoniated Mercury Ointment: White Precipitate Ointment.

Ammoniated Mercury, finely powdered	50 grammes
Simple Ointment . . .	950 grammes

Triturate the Ammoniated Mercury with a portion of the Simple Ointment, until smooth; gradually add the remainder, mixing thoroughly by trituration.

UNGUENTUM HYDRARGYRI COMPOSITUM

[Ung. Hydrarg. Co.]

Compound Ointment of Mercury

Synonym. Compound Mercury Ointment.

Compound Ointment of Mercury contains 12 per cent. of Mercury (limits, 11·5 to 12·5).

Mercury Ointment	400 grammes
Yellow Beeswax	240 grammes
Olive Oil	240 grammes
Camphor	120 grammes

Melt the Yellow Beeswax, add the Olive Oil, and then the Mercury Ointment; dissolve the Camphor in the mixture; stir, until cold.

Assay. Carry out the Assay as directed under 'Unguentum Hydrargyri', using about 3 grammes, accurately weighed. Each millilitre of *N/10 ammonium thiocyanate* is equivalent to 0·01003 gramme of Hg.

UNGUENTUM HYDRARGYRI NITRATIS DILUTUM

[Ung. Hydrarg. Nit. Dil.]

Dilute Ointment of Mercuric Nitrate

Synonym. Diluted Mercuric Nitrate Ointment.

Strong Ointment of Mercuric Nitrate	200 grammes
Yellow Soft Paraffin	800 grammes

Mix by trituration.

UNGUENTUM HYDRARGYRI NITRATIS FORTE

[Ung. Hydrarg. Nit. Fort.]

Strong Ointment of Mercuric Nitrate

Synonyms. Unguentum Hydrargyri Nitratis: Mercuric Nitrate Ointment.

Strong Ointment of Mercuric Nitrate contains not less than the equivalent of 6·7 per cent. of Hg.

Mercury	10 grammes
Nitric Acid	30 millilitres
Lard	40 grammes
Olive Oil	70 grammes

Dissolve the Mercury in the Nitric Acid without the aid of heat, shaking gently from time to time. Heat the Lard and Olive Oil together on a sand-bath, so that the mixture, when transferred to a heated earthen jar capable of holding ten times the quantity, is at a temperature of about, and not above, 150°. Add the cold mercurial solution very gradually, stirring constantly with a glass or wooden spatula to promote the disengagement of fumes. Keep the mixture at a temperature of not less than 90° until frothing ceases, then stir until cold.

Assay. Take about 3 grammes, accurately weighed, in a long-necked flask of about 250 millilitres capacity. Add 20 millilitres of *sulphuric acid*, and heat cautiously until the mixture darkens. Add gradually 2 millilitres of *nitric acid*, rotating the flask to assist the escape of evolved gases. Heat, and maintain just below the boiling-point. Repeat several times the treatment with *nitric acid* and heating, until an almost colourless solution remains. Cool, dilute carefully with *water*, and remove residual nitric acid by boiling. Again cool and dilute, neutralise with *solution of sodium hydroxide*, make slightly acid with *hydrochloric acid*, warm to about 80°, and pass in *hydrogen sulphide* until precipitation is complete. Collect the precipitate in a Gooch crucible, and wash it, first with *solution of hydrogen sulphide* until free from acid, then with *alcohol (95 per cent.)*, and finally with *carbon disulphide*; dry at 110°. Each gramme of the residue is equivalent to 0·8622 gramme of Hg.

Preparation. Unguentum Hydrargyri Nitratis Dilutum.

UNGUENTUM HYDRARGYRI OLEATI

[Ung. Hydrarg. Oleat.]

Ointment of Oleated Mercury

Synonym. Mercuric Oleate Ointment.

Oleated Mercury . . .	250 grammes
Simple Ointment . . .	750 grammes

Mix by trituration.

UNGUENTUM HYDRARGYRI SUBCHLORIDI

[Ung. Hydrarg. Subchlor.]

Ointment of Mercurous Chloride

Synonyms. Mercurous Chloride Ointment: Calomel Ointment.

Mercurous Chloride	200 grammes
Simple Ointment	800 grammes

Triturate the Mercurous Chloride with a portion of the Simple Ointment, until smooth; gradually add the remainder, mixing thoroughly by trituration.

UNGUENTUM PARAFFINI

[Ung. Paraff.]

Paraffin Ointment

White Beeswax . . .	20 grammes
Hard Paraffin	80 grammes
White Soft Paraffin, or Yellow Soft Paraffin . . .	900 grammes

Melt together; stir, until cold.

When Paraffin Ointment is used in a white ointment, it should be prepared with White Soft Paraffin; and, when used in a coloured ointment, it should be prepared with Yellow Soft Paraffin.

UNGUENTUM PHENOLIS

[Ung. Phenol.]

Ointment of Phenol

Synonyms. Unguentum Acidi Carbolici: Phenol Ointment.

Phenol	30 grammes
White Beeswax . . .	75 grammes
Lard	50 grammes
Hard Paraffin	75 grammes
White Soft Paraffin . . .	770 grammes

Melt together the White Beeswax, Lard, and Hard and Soft Paraffins; dissolve the Phenol in the mixture; stir. until cold.

UNGUENTUM SIMPLEX

[Ung. Simp.]

Simple Ointment

Wool Fat	50 grammes
Hard Paraffin	100 grammes
White Soft Paraffin, or Yellow Soft Paraffin . . .	850 grammes

Melt together; stir, until cold.

When Simple Ointment is used in a white ointment, it should be prepared with White Soft Paraffin; and when used in a coloured ointment, it should be prepared with Yellow Soft Paraffin.

UNGUENTUM SULPHURIS

[Ung. Sulphur.]

Ointment of Sulphur

Synonym. Sulphur Ointment.

Sublimed Sulphur, finely sifted .	100 grammes
Simple Ointment . . .	900 grammes

Triturate the Sublimed Sulphur with a portion of the Simple Ointment, until smooth; gradually add the remainder, mixing thoroughly by trituration.

UNGUENTUM ZINCI OLEATIS

[Ung. Zinc. Oleat.]

Ointment of Zinc Oleate

Synonym. Zinc Oleate Ointment.

Zinc Sulphate	30 grammes
Hard Soap, in shavings . .	90 grammes
Distilled Water, boiling	of each a sufficient quantity
White Soft Paraffin	

Dissolve the Zinc Sulphate in 60 millilitres of Distilled Water. Dissolve the Hard Soap in 600 millilitres of Distilled Water. Mix the solutions; heat to boiling; allow the melted zinc oleate to rise to the surface; cool, until it solidifies; pour off the aqueous liquid; boil the zinc oleate with successive quantities of Distilled Water, until the washings afford not more than a slight *reaction* for sulphates. Drain the washed zinc oleate, and melt it on a water-bath with an equal weight of the Soft Paraffin; stir, until cold.

UNGUENTUM ZINCI OXIDI

[Ung. Zinc. Oxid.]

Ointment of Zinc Oxide

Synonyms. Unguentum Zinci; Zinc Ointment.

Zinc Oxide, finely sifted . .	150 grammes
Simple Ointment . . .	850 grammes

Triturate the Zinc Oxide with a portion of the Simple Ointment, until smooth; gradually add the remainder, mixing thoroughly by trituration.

UREA

[Urea]

Urea

$CO(NH_2)_2$ . . . . Mol. Wt. 60·05

Urea is the diamide of carbonic acid. It may be prepared from ammonium cyanate.

Characters. Colourless, transparent, prismatic crystals; almost odourless; taste, cooling and saline.

Soluble in 1 part of *water*, in 5 parts of *alcohol* (*90 per cent.*), and in 1 part of boiling *alcohol* (*90 per cent.*); insoluble in *ether*, and in *chloroform*.

Tests for Identity and Purity. *Melting-point*, 130° to 132°.

Heat 0·5 gramme in a test tube; it liquefies, and ammonia is given off; continue the heating, until the liquid becomes turbid, cool, dissolve in a mixture of 10 millilitres of *water* and 1 millilitre of *2N sodium hydroxide*, and add 1 drop of *solution of copper sulphate*; a reddish-violet colour is produced.

Dissolve 0·1 gramme in 1 millilitre of *water*, and add 1 millilitre of *nitric acid*; a white crystalline precipitate is produced.

Leaves, on incineration, not more than 0·1 per cent. of residue.

DOSES

Metric.	**Imperial.**
1 to 16 grammes.	**15 to 240 grains.**

VACCINUM TYPHO-PARATYPHOSUM

[Vaccin. Typho-paratyphos.]

Anti-typhoid-paratyphoid Vaccine

CAUTION.—In any part of the British Empire in which Anti-typhoid-paratyphoid Vaccine is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

Synonym. T.A.B. Vaccine.

Anti-typhoid-paratyphoid Vaccine is a sterile suspension of the micro-organisms *Bacillus typhosus*, *Bacillus paratyphosus A*, and *Bacillus paratyphosus B*, which have been killed. It contains in 1 millilitre 1,000 million *Bacillus typhosus*, 500 million *Bacillus paratyphosus A*, and 500 million *Bacillus paratyphosus B*.

It is prepared in the following way. A culture of each of the three micro-organisms specified is selected, and examined so as to ensure its identity and its freedom from contamination with other micro-organisms. Each culture may be grown on a solid medium for twenty-four hours, after which the growth is washed off the medium with Physiological Solution of Sodium Chloride, in which it remains suspended. The micro-organisms are killed by heating to 55° for one hour. The number of micro-organisms per millilitre in each of the three suspensions is estimated by enumeration in a suitable counting chamber, or by some other appropriate method. The three suspensions are then mixed in such proportions as to give a suspension, containing the required number of each of the micro-organisms per millilitre. An antiseptic is added in such concentration as will prevent the growth of organisms at least as effectively as 0·5 per cent. w/v of Phenol, and the final product is distributed, under aseptic conditions, into previously sterilised containers, which are sealed so as to exclude bacteria.

Characters. A colourless, opalescent liquid.

Test for Purity. It complies with the *tests for sterility*.

Storage. Anti-typhoid-paratyphoid Vaccine should not be used later than eighteen months after preparation.

DOSES

By subcutaneous injection.

0·5 mil. (first dose).

1·0 mil. (second dose after 7 to 10 days interval).

VACCINUM VACCINIÆ

[Vaccin. Vacciniæ]

Vaccine Lymph

CAUTION.—In any part of the 'British Empire in which Vaccine Lymph is controlled by law, care must be taken that the provisions of such law are duly complied with. (*See page 12.*)

Vaccine Lymph is a preparation of the Vaccinal substance which is obtained from the vesicles produced by inoculation of vaccinia virus on the skin of healthy animals. It is prepared with precautions to exclude bacterial contamination, as far as possible.

The vaccine lymph, having been transferred to sterile vessels, is treated with Glycerin, or other partial disinfectants, to reduce the total number of living bacteria and other micro-organisms to not more than [illegible]000 per millilitre. It is tested to ensure the absence of living gas-producing anaerobic micro-organisms, and of haemolytic streptococci. It is stored at a temperature below 0°, until it is introduced into sterilised glass containers, which are then sealed so as to exclude bacteria. These are kept at temp

Characters. A viscid, colourless liquid, containing opaque white matter in suspension.

Test for Identity. It produces the characteristic lesion of vaccinia virus, when applied to a scarified area of the skin of a calf, rabbit, or guinea-pig.

Tests for Purity. Contains not more than 1,0000 living bacteria and other micro-organisms per millilitre.

Complies with the *test for the absence of living gas-producing anaerobic organisms.*

Complies with the *test for the absence of haemolytic streptococci.*

Potency. A mixture, containing one volume and 999 volumes of *physiological solution of sodium chloride*, when applied to a scarified area of the shaved skin of the rabbit, or of the guinea-pig, produces the characteristic lesions of vaccinia virus. For comparison a similar dilution of the Standard Potency is set up in similar conditions. Test within 6 months of issue.

Storage. Vaccine lymph, when stored at a temperature below 0°, maintains its potency for ~~long periods~~ at least 6 months. When stored at temperatures from 0° to 5°, the potency may be expected to be retained for three months, but, when stored at temperatures from 5° to 10°, the potency is retained for four weeks only. When stored above 10°, the potency cannot be assured beyond seven days.

Containers. The containers should be glass capillary tubes of a size sufficient to hold one human dose; containers to hold several doses may be used in an emergency.

DOSES

Metric.		Imperial.
	By scarification.	
0·06 mil.		1 minim.

VALERIANA

[Valerian.]

Valerian

Synonyms. Valerianæ Rhizoma : Valerian Rhizome.

Valerian consists of the rhizome and roots of *Valeriana officinalis* Linn., collected in the autumn, and dried. It contains not more than 5 per cent. of other organic matter.

Characters. Rhizome, erect 2 to 4 centimetres long, entire or longitudinally divided, yellowish-brown externally, whitish internally ; fracture, short and horny ; periderm, thin ; cortex, parenchymatous with numerous starch grains which are 2- to 4-compound or rarely single, each usually with a central hilum, and 3 to 20 microns in diameter; endodermal cells, containing volatile oil; pith, with scattered groups of large sclerenchymatous cells with thick, pitted walls. Roots, numerous, slender, brittle, 2 to 10 centimetres long; piliferous layer papillose, with many root-hairs; exodermis of large cells, containing volatile oil; cortex and pith, parenchymatous, with numerous starch grains like those of the rhizome. Odour, strong and characteristic; taste, sweetish, camphoraceous and slightly bitter.

Test for Purity. *Ash*, not more than 10 per cent.

Preparation. Tinctura Valerianæ Ammoniata.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	**5 to 15 grains.**

ZINCI CHLORIDUM

[Zinc. Chlorid.]

Zinc Chloride

$ZnCl_2$ . . . . . . Mol. Wt. 136·3

Zinc Chloride may be obtained by the interaction of hydrochloric acid and zinc. It contains zinc, equivalent to not less than 95 per cent. of $ZnCl_2$.

Characters. A white or nearly white, granular powder, or opaque white sticks or masses. Very deliquescent, and caustic.

Soluble in less than 1 part of *water*, in about 1·5 parts of *alcohol* (*90 per cent.*), and in 2 parts of *glycerin*.

An aqueous solution is acid to *litmus*.

Heated to about 260°, it melts to a clear liquid which, on further heating, is partly volatilised, forming dense white fumes.

Tests for Identity. Yields the *reactions* characteristic of zinc, and of chlorides.

Tests for Purity. Dissolve about 1 gramme, accurately weighed, in 50 millilitres of *water*, and titrate with *N/10 hydrochloric acid*, using *solution of methyl orange* as indicator; not more than 12·5 millilitres of *N/10 hydrochloric acid* per gramme is required (limit of oxychloride).

Dissolve 1 gramme in 5 millilitres of *water*, add 5 millilitres of *solution of sodium hydroxide*, and warm; no ammonia is given off (limit of ammonia).

Assay. Dissolve about 0·2 gramme, accurately weighed, in 120 millilitres of *water*, acidified with 2 to 4 drops of *dilute sulphuric acid*, and complete the Assay as described under 'Zinci Sulphas'. Each millilitre of *M/5 potassium iodate* is equivalent to 0·00454 gramme of $ZnCl_2$.

ZINCI OXIDUM

[Zinc. Oxid.]

Zinc Oxide

ZnO . . . . . . Mol. Wt. 81·38

Zinc Oxide may be obtained from metallic zinc by combustion in air. It contains not less than 99 per cent. of ZnO, calculated with reference to the freshly ignited substance.

Characters. A soft, white or faintly yellowish-white powder, free from grittiness; odourless; tasteless.

Insoluble in *water*, and in *alcohol* (*95 per cent.*); soluble in solutions of *sodium hydroxide*, and in dilute mineral acids.

Tests for Identity. Becomes yellow when strongly heated, the yellow colour disappearing on cooling.

A solution in *dilute hydrochloric acid* yields the *reactions* characteristic of zinc.

Tests for Purity. Dissolve 2 grammes in a mixture of 30 millilitres of *dilute hydrochloric acid* and 10 millilitres of *water*, to which has been added 1 drop of *solution of lead subacetate*; the solution is clear and colourless (absence of metallic zinc).

Dissolve 2 grammes in 20 millilitres of *water* and 5 millilitres of *glacial acetic acid*, and add 5 drops of *solution of potassium chromate*; the solution remains clear (limit of lead).

0·1 gramme complies with the *limit test for iron.*

Arsenic limit, 10 parts per million.

Loses, on ignition, not more than 1 per cent. of its weight.

Assay. Dissolve about 1·5 grammes, accurately weighed, and 2·5 grammes of *ammonium chloride* in 50 millilitres of *N/1 sulphuric acid*, and titrate the excess of acid with *N/1 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/1 sulphuric acid* is equivalent to 0·04069 gramme of ZnO.

Preparations. Gelatinum Zinci.
Pasta Zinci Oxidi Composita.
Unguentum Zinci Oxidi.

DOSES

Metric.	**Imperial.**
0·3 to 0·6 gramme.	**5 to 10 grains.**

ZINCI STEARAS

[Zinc. Stear.]

Zinc Stearate

Zinc Stearate may be prepared by the interaction of a soluble zinc salt and a solution of the sodium salt of stearic acid of commerce. It consists chiefly of zinc stearate together with variable proportions of zinc palmitate. It contains zinc, equivalent to not less than 13 per cent., and not more than 15·5 per cent., of ZnO.

Characters. A light, white, impalpable, amorphous powder, free from grittiness; odour, slight and characteristic.

Insoluble in *water*, in *alcohol* (*90 per cent.*), and in *ether.*

Tests for Identity. Boil 1 gramme with a mixture of 25 millilitres of *water* and 5 millilitres of *hydrochloric acid*; an oily layer of fatty acids is produced, which floats on the surface of the liquid; the aqueous layer yields the *reactions* characteristic of zinc.

Tests for Purity. Neutral to *litmus.*

Boil 1 gramme with 25 millilitres of *water* and 5 millilitres of *hydrochloric acid,* filter while hot, and wash with 25 millilitres of hot *water.* To the filtrate add *dilute solution of ammonia* until just alkaline, and *solution of ammonium hydrosulphide* in excess. Filter, evaporate the filtrate to dryness, and ignite the residue. Extract with 10 millilitres of *water*, filter, evaporate to dryness, ignite, and weigh; the residue weighs not more than 0·02 gramme (limit of alkalis and alkaline earths).

Mix 5 grammes with 100 millilitres of *ether*, shake for half an hour, and filter; evaporate 50 millilitres of the filtrate to dryness; the residue weighs not more than 0·05 gramme (limit of free fatty acids).

0·2 gramme, warmed with 25 millilitres of *water* containing 1·5 millilitres of *hydrochloric acid*, and filtered, complies with the *limit test for sulphates.*

Assay. Mix about 1 gramme, accurately weighed, with 50 millilitres of *N/10 sulphuric acid*, boil for ten minutes, cool, and filter. Wash thoroughly, and titrate the combined washings and filtrate with *N/10 sodium hydroxide*, using *solution of methyl orange* as indicator. Each millilitre of *N/10 sulphuric acid* is equivalent to 0·004069 gramme of ZnO.

ZINCI SULPHAS

[Zinc. Sulph.]

Zinc Sulphate

$ZnSO_4,7H_2O$ . . . . Mol. Wt. 287·5

Zinc Sulphate may be obtained by the interaction of zinc and sulphuric acid. It contains not less than 99·5 per cent., and not more than the equivalent of 101 per cent., of $ZnSO_4,7H_2O$.

Characters. Colourless, transparent crystals, or crystalline powder; odourless; taste, astringent and metallic.

Soluble in less than 1 part of *water*.

An aqueous solution is acid to *litmus*.

Tests for Identity. Yields the *reactions* characteristic of zinc, and of sulphates.

Tests for Purity. Dissolve 1 gramme in 20 millilitres of *water*; the solution is not acid to *methyl orange* (limit of acidity).

Dissolve 0·5 gramme in 10 millilitres of *water*, add excess of *dilute solution of ammonia*, and allow to stand; the solution remains colourless, and no precipitate is produced within half an hour (limit of copper, of aluminium, of nickel, of manganese, and of magnesium).

1 gramme complies with the *limit test for chlorides*.

0·1 gramme complies with the *limit test for iron*.

Arsenic limit, 5 parts per million.

Assay. Dissolve about 0·4 gramme, accurately weighed, in 120 millilitres of *water*, acidified with one or two drops of *dilute sulphuric acid*, add 25 millilitres of *solution of mercuric ammonium thiocyanate*, set aside for five minutes, stir thoroughly to induce crystallisation, and allow to stand for one hour. Transfer to a small suction filter, washing five times with 10 millilitre quantities of a mixture of 1 volume of *solution of mercuric ammonium thiocyanate* and sufficient *water* to produce 50 volumes, so as to transfer the whole of the precipitate to the filter paper in the process. Transfer the filter paper and precipitate completely to a 300 millilitre stoppered bottle. Add 40 millilitres of *hydrochloric acid* and 5 millilitres of *chloroform*, and titrate with *M/5 potassium iodate*, the end-point being indicated by the disappearance of violet colour from the chloroform layer. Each millilitre of *M/5 potassium iodate* is equivalent to 0·009585 gramme of $ZnSO_4,7H_2O$.

DOSES

Metric.	**Imperial.**
0·06 to 0·2 gramme.	**1 to 3 grains.**

Emetic Doses

0·6 to 2 grammes.	**10 to 30 grains.**

ZINGIBER

[Zingib.]

Ginger

Ginger is the rhizome of *Zingiber officinale* Roscoe, scraped to remove the dark outer skin, and dried in the sun. It is known in commerce as unbleached Jamaica ginger.

Characters. Rhizome, laterally compressed, bearing short, flattish, obovate, oblique branches on the upper side, each having at its apex a depressed scar; in pieces, about 7 to 15 centimetres long, 1·5 to 6·5 centimetres wide (usually 3 to 4 centimetres), and 1 to 1·5 centimetres thick; externally buff coloured, showing longitudinal striations and occasional loose fibres; fracture, short with projecting fibres; smoothed transverse surface, exhibiting a narrow cortex, a well-marked endodermis and a wide stele, the whole showing numerous scattered, greyish points (fibro-vascular bundles) and smaller yellowish points (secretion cells). Ground tissue, filled with starch consisting almost entirely of single ovate to subrectangular grains up to 40 microns long, 25 microns wide and 7 microns thick, the hilum being in a terminal projection; vessels, reticulate or spiral, giving no characteristic *reaction* for lignin, and often accompanied by narrow cells containing a dark brown pigment; oil-cells, subspherical and having suberised walls; sclerenchymatous cells, calcium oxalate crystals, and cork-cells, absent. Odour, agreeable and aromatic; taste, pungent.

Tests for Purity. *Alcohol (90 per cent.)-soluble extractive*, not less than 4·5 per cent.; *water-soluble extractive*, not less than 10 per cent.; *ash*, not more than 6 per cent.; *water-soluble ash*, not less than 1·7 per cent.

Preparation. Tinctura Zingiberis Fortis.
Syrupus Zingiberis.
Tinctura Zingiberis Mitis.

DOSES

Metric.	Imperial.
0·3 to 1 gramme.	5 to 15 grains.

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Unless expressly stated otherwise, Alcohol (95 per cent.) or the Dilute Alcohols, when indicated in the Pharmacopœia or the Appendices for use in Tests or Assays, or in the making of solutions of reagents, may be replaced by Industrial Methylated Spirit, diluted so as to be of equivalent alcoholic strength, provided that the law and the statutory regulations governing the use of Industrial Methylated Spirit are observed.

Industrial Methylated Spirit must not be used for solubility tests.

See B.P 1948 for Full Description of these Reagents with purity etc.

APPENDIX I

Also See page 75 (I

MATERIALS AND SOLUTIONS EMPLOYED IN TESTS

Acetic Acid : of the British Pharmacopœia (approximately 33 per cent. w/w of $C_2H_4O_2$).

Acetic Acid (90 per cent.) : to *glacial acetic acid* add a sufficient quantity of *water* to produce a solution containing 90 per cent. w/v of $C_2H_4O_2$.

Acetic Acid, Dilute : of the British Pharmacopœia (approximately 6 per cent. w/w of $C_2H_4O_2$).

Acetic Acid, Glacial : of the British Pharmacopœia (approximately 99 per cent. w/w of $C_2H_4O_2$).

Acetic Anhydride : $C_4H_6O_3$, of Reagent purity.

Acetone : of the British Pharmacopœia.

Albumen : the liquid white of fresh eggs.

Alcohol (95 per cent.) : of the British Pharmacopœia.

Alcohol (90 per cent.) : of the British Pharmacopœia. *Specific gravity* (15·5°/15·5°), limited to 0·8334 to 0·8340.

Alcohol (80 per cent.): of the British Pharmacopœia. *Specific gravity* (15·5°/15·5°), limited to 0·8634 to 0·8640.

Alcohol (70 per cent.): of the British Pharmacopœia. *Specific gravity* (15·5°/15·5°), limited to 0·8896 to 0·8901.

Alcohol (60 per cent.): of the British Pharmacopœia.

Alcohol (50 per cent.): of the British Pharmacopœia.

Alcohol (45 per cent.): of the British Pharmacopœia.

Alcohol (20 per cent.): of the British Pharmacopœia.

Alcohol, Ammoniacal: mix 975 millilitres of *alcohol (95 per cent.)* with 25 millilitres of *strong solution of ammonia.*

Alcohol, Dehydrated: of the British Pharmacopœia.

Alkanna: the dried root of *Alkanna tinctoria* Tausch.

Alkanna, Tincture of: macerate 20 grammes of bruised *alkanna* in 100 millilitres of *alcohol (90 per cent.)* for seven days; filter.

Tincture of Alkanna gradually deteriorates on keeping, and must not be used later than six months after the date of preparation.

Alum: of the British Pharmacopœia.

Alum, Solution of: a 5 per cent. w/v solution of *alum* in *water.*

Ammonia, Dilute Solution of: of the British Pharmacopœia (approximately 10 per cent. w/w of NH_3).

Ammonia, Strong Solution of: of the British Pharmacopœia (approximately 32·5 per cent. w/w of NH_3).

Ammonium Acetate: $CH_3{\cdot}CO{\cdot}O{\cdot}NH_4$, of Reagent purity.

Ammonium Acetate, Dilute Solution of: of the British Pharmacopœia (approximately 7·2 per cent. w/v of $C_2H_7O_2N$).

Ammonium Carbonate : of the British Pharmacopœia.

Ammonium Carbonate, Solution of : dissolve 5 grammes of *ammonium carbonate* in a mixture of 7·5 millilitres of *dilute solution of ammonia* and 50 millilitres of *water* ; add a sufficient quantity of *water* to produce 100 millilitres ; filter, if necessary.

Ammonium Chloride : of the British Pharmacopœia.

Ammonium Chloride, Solution of : a 10 per cent. w/v solution of *ammonium chloride* in *water.*

Ammonium Chloride, Solution of, (Nessler's) : dissolve 3·15 grammes of *ammonium chloride* in a sufficient quantity of *ammonia-free water* to produce 1000 millilitres.

Ammonium Chloride, Dilute Solution of, (Nessler's) : mix 10 millilitres of *solution of ammonium chloride (Nessler's)* with a sufficient quantity of *ammonia-free water* to produce 1000 millilitres.

Ammonium Hydrosulphide, Solution of : saturate 120 millilitres of *dilute solution of ammonia* with washed *hydrogen sulphide* ; add 80 millilitres of *dilute solution of ammonia.*

Solution of Ammonium Hydrosulphide must be recently prepared.

Ammonium Molybdate : $(NH_4)_6Mo_7O_{24},4H_2O$, of Reagent purity.

Ammonium Molybdate, Solution of : a 10 per cent. w/v solution of *ammonium molybdate* in *water.*

Ammonium Oxalate : $(NH_4)_2C_2O_4,H_2O$, of Reagent purity.

Ammonium Oxalate, Solution of : a 2·5 per cent. w/v solution of *ammonium oxalate* in *water.*

Ammonium Phosphate : $(NH_4)_2HPO_4$, of Reagent purity.

Ammonium Phosphate, Solution of : a 10 per cent. w/v solution of *ammonium phosphate* in *water.*

Ammonium Sulphate: $(NH_4)_2SO_4$, of Reagent purity.

Ammonium Thiocyanate: NH_4SCN, of Reagent purity.

Ammonium Thiocyanate, Solution of: a 10 per cent. w/v solution of *ammonium thiocyanate* in *water*.

Ammonium Vanadate: NH_4VO_3, of Reagent purity.

Amyl Alcohol: $C_5H_{11}OH$, *boiling-point*, 125° to 143°, of Reagent purity.

Aniline: $C_6H_5NH_2$, of Reagent purity.

Aniline Hydrochloride: $C_6H_5NH_2,HCl$, of Reagent purity.

Aniline Hydrochloride, Solution of: dissolve 2 grammes of *aniline hydrochloride* in a mixture of 65 millilitres of *alcohol (90 per cent.)* and 35 millilitres of *water*; add 2 millilitres of *hydrochloric acid*.

Solution of Aniline Hydrochloride must be freshly prepared.

Antimony Trichloride: $SbCl_3$, of Reagent purity.

Arsenic Trioxide: of the British Pharmacopœia.

Auric Chloride: $NaAuCl_4,2H_2O$, of Reagent purity.

Auric Chloride, Solution of: a 2 per cent. w/v solution of *auric chloride* in *water*.

Barium Chloride: $BaCl_2,2H_2O$, of Reagent purity.

Barium Chloride, Solution of: a 10 per cent. w/v solution of *barium chloride* in *water*.

Barium Hydroxide: $Ba(OH)_2,8H_2O$, of Reagent purity.

Barium Hydroxide, Solution of: a 3 per cent. w/v solution of *barium hydroxide* in *water*.

Benzene: C_6H_6, of Reagent purity.

Bismuth Oxynitrate: of Reagent purity.

Borax: of the British Pharmacopœia.

Bromine: Br, of Reagent purity.

Bromine, Solution of: a saturated solution of *bromine* in *water.*

Cadmium Iodide: CdI_2, of Reagent purity.

Cadmium Iodide, Solution of: a 5 per cent. w/v solution of *cadmium iodide* in *water.*

Cadmium Sulphate: of Reagent purity.

Calcium Carbonate: of the British Pharmacopœia.

Calcium Chloride: of the British Pharmacopœia.

Calcium Chloride, Crystallised: $CaCl_2,6H_2O$, of Reagent purity.

Calcium Chloride, Solution of: a 10 per cent. w/v solution of *crystallised calcium chloride* in *water.*

Calcium Hydroxide: of the British Pharmacopœia.

Calcium Hydroxide, Solution of: of the British Pharmacopœia (approximately 0·15 per cent. w/v of $Ca(OH)_2$).

Calcium Sulphate: $CaSO_4,2H_2O$, of Reagent purity.

Calcium Sulphate, Solution of: a saturated solution of *calcium sulphate* in *water.*

Carbon Dioxide: CO_2, washed.

Carbon Disulphide: CS_2, of Reagent purity.

Carbon Tetrachloride: of the British Pharmacopœia.

Carmine: of commerce.

Carmine Fibrin: soak washed and shredded *fibrin* for twenty-four hours in a solution, prepared by dissolving 1 gramme of *carmine* in 1 millilitre of *strong solution of ammonia* and diluting with 400 millilitres of *water*; strain; wash the *fibrin* with *water*, until the washings are colourless; store under *ether*.

Charcoal, Decolourising: of Reagent purity.

Chloral Hydrate: of the British Pharmacopœia.

Chloral Hydrate with Iodine, Solution of: dissolve 50 grammes of *chloral hydrate* in 20 millilitres of *water*; add excess of *iodine* in crystals; shake, until the solution is saturated, and allow the undissolved iodine to remain in the solution.

Chlorinated Lime: of the British Pharmacopœia.

Chlorinated Lime, Solution of: mix 100 grammes of *chlorinated lime* with 1000 millilitres of *water*; transfer the mixture to a stoppered bottle; set aside for three hours, shaking occasionally; filter through calico.

Solution of Chlorinated Lime should be kept in a stoppered bottle, protected from light, and stored in a cool place.

Chlorinated Soda, Solution of: dissolve 150 grammes of *sodium carbonate* in 250 millilitres of *water*; thoroughly triturate 100 grammes of *chlorinated lime* with 750 millilitres of water; mix the two liquids; shake occasionally during three or four hours; filter.

Solution of Chlorinated Soda must be recently prepared.

Chlorine: Cl, washed.

Chlorine, Solution of: a saturated solution of *chlorine* in *water*.

Solution of Chlorine must be freshly prepared.

Chloroform: of the British Pharmacopœia.

Chloroform Water: of the British Pharmacopœia.

Chromium Trioxide: of the British Pharmacopœia.

Citric Acid: of the British Pharmacopœia.

Collodion, Flexible: of the British Pharmacopœia.

Congo-red Fibrin: soak washed and shredded *fibrin* overnight in a 2 per cent. solution of *Congo-red* in *alcohol (90 per cent.)*; strain; wash the *fibrin* with *water*, and store under *ether*.

Copper: in foil, wire or turnings, of commerce.

Copper Acetate: $Cu(C_2H_3O_2)_2,H_2O$, of Reagent purity.

Copper Acetate, Strong Solution of: a 5 per cent. w/v solution of *copper acetate* in *water*.

Copper Acetate, Dilute Solution of: a 0·05 per cent. w/v solution of *copper acetate* in *water*.

Copper Carbonate: basic precipitated copper carbonate, of commerce.

Copper Nitrate: $Cu(NO_3)_2,3H_2O$, of Reagent purity.

Copper Oxide, Ammoniacal Solution of: shake 5 grammes of *copper carbonate* with 100 millilitres of *strong solution of ammonia*, occasionally during twelve hours; set aside for twenty-four hours; pour off the clear liquid.

Ammoniacal Solution of Copper Oxide must be freshly prepared.

Copper Sulphate: of the British Pharmacopœia.

Copper Sulphate, Anhydrous: white, of commerce.

Copper Sulphate, Solution of: a 10 per cent. w/v solution of *copper sulphate* in *water*.

Corallin: the sodium derivative of rosolic acid, of commerce.

Corallin, Alkaline Solution of: dissolve 30 grammes of *sodium carbonate* in 70 millilitres of *water*, add a small quantity of *corallin*, and shake.

Alkaline Solution of Corallin must be freshly prepared.

Cresol, Ortho: C_7H_8O, pure dry redistilled *o*-cresol with a freezing-point not below 30°.

Cupric Chloride: $CuCl_2,2H_2O$, of Reagent purity.

Cuprous Chloride: Cu_2Cl_2, of Reagent purity.

Cuprous Chloride, Acid Solution of: a 20 per cent. w/v solution of *cuprous chloride* in *hydrochloric acid.*

Dextrose: of the British Pharmacopœia.

Dimethylaminobenzaldehyde: *p*-dimethylaminobenzaldehyde, $(CH_3)_2N{\cdot}C_6H_4{\cdot}CHO$, of Reagent purity.

Dimethylaminobenzaldehyde, Solution of: a 0·125 per cent. w/v solution of *dimethylaminobenzaldehyde* in a mixture of equal volumes of *sulphuric acid* and *water.*

Solution of Dimethylaminobenzaldehyde must be prepared not less than twenty-four hours before use, and must not be used later than seven days after preparation.

Dimethyl Sulphate: $(CH_3)_2SO_4$, of Reagent purity.

Diphenylthiocarbazone, $C_6H_5N:N{\cdot}CS{\cdot}NHNHC_6H_5$, of Reagent purity.

Ergotoxine Ethanesulphonate: of the British Pharmacopœia, rendered anhydrous by drying over phosphorus pentoxide.

Ergotoxine Ethanesulphonate, Solution of: a 0·012 per cent. w/v solution of *ergotoxine ethanesulphonate* in a 1 per cent. w/v solution of *tartaric acid* in *water.*

1 millilitre of this solution contains the equivalent of 0·0001 gramme of anhydrous ergotoxine.

Solution of Ergotoxine Ethanesulphonate must be freshly prepared.

Ether: of the British Pharmacopœia.

Ether, Anæsthetic: of the British Pharmacopœia.

Ferric Ammonium Sulphate: $Fe(NH_4)(SO_4)_2,12H_2O$, of Reagent purity.

Ferric Chloride: $FeCl_3$, of Reagent purity.

Ferric Chloride, Solution of: of the British Pharmacopœia (approximately 15 per cent. w/v of $FeCl_3$).

Ferric Chloride, Test-solution of: a 5 per cent. w/v solution of *ferric chloride* in *water.*

Ferrous Sulphate: of the British Pharmacopœia.

Ferrous Sulphate, Acid Solution of: dissolve 7 grammes of *ferrous sulphate* in 90 millilitres of freshly boiled and cooled *water*, and add sufficient *sulphuric acid* to produce 100 millilitres.

Acid Solution of Ferrous Sulphate must be freshly prepared.

Ferrous Sulphate, Solution of: a 2 per cent. w/v solution of *ferrous sulphate* in freshly boiled and cooled *water.*

Solution of Ferrous Sulphate must be freshly prepared.

Fibrin: the insoluble protein which separates during the coagulation of blood, washed and shredded.

Formaldehyde, Solution of: of the British Pharmacopœia.

Gelatin: of the British Pharmacopœia.

Glycerin: of the British Pharmacopœia.

Hydriodic Acid: constant-boiling hydriodic acid containing approximately 57 per cent. w/w of HI, of Reagent purity.

Hydrochloric Acid: of the British Pharmacopœia (approximately 32 per cent. w/w of HCl).

Hydrochloric Acid, Dilute : of the British Pharmacopœia (approximately 10 per cent. w/w of HCl).

Hydrochloric Acid, Gaseous : HCl, dry.

Hydrogen Peroxide, Solution of : of the British Pharmacopœia (approximately 3 per cent. w/v of H_2O_2).

Hydrogen Sulphide, *Synonym*—Sulphuretted Hydrogen : H_2S, washed.

Hydrogen Sulphide, Solution of : a recently prepared solution of *hydrogen sulphide* in *water.*

Hydroxylamine Hydrochloride : NH_2OH,HCl, of Reagent purity.

Hypophosphorous Acid, Dilute : of the British Pharmacopœia (approximately 10 per cent w/w of H_3PO_2).

Indigo Carmine : of the British Pharmacopœia.

Indigo Carmine, Solution of : a solution of *indigo carmine* in a 20 per cent. w/v solution of *nitrogen-free sulphuric acid,* adjusted so that 10 millilitres requires, for decolourisation, a solution of 0·001 gramme of *potassium nitrate* in 10 millilitres of *water* and 20 millilitres of *sulphuric acid.*

Industrial Methylated Spirit : of the British Pharmacopœia.

Iodic Acid : HIO_3, of Reagent purity.

Iodine : of the British Pharmacopœia.

Iodine, Solution of : dissolve 2 grammes of *iodine* and 3 grammes of *potassium iodide* in a sufficient quantity of *water* to produce 100 millilitres.

Iodine Pentoxide : I_2O_5, pure, prepared by oxidation of *iodine* with chloric acid, and dehydration of the resulting iodic acid.

Iodine Trichloride : ICl_3, of Reagent purity.

Iron : of the British Pharmacopœia.

Iron, Reduced : of the British Pharmacopœia.

Kieselguhr : a natural diatomaceous earth, purified by treating with *dilute hydrochloric acid*, washing with *water* and drying.

Lactose : of the British Pharmacopœia.

Lead Acetate : of the British Pharmacopœia.

Lead Acetate, Solution of : a 10 per cent. w/v solution of *lead acetate* in recently boiled *water*.

Lead Dioxide : PbO_2, of Reagent purity.

Lead Monoxide : of the British Pharmacopœia.

Lead Nitrate : $Pb(NO_3)_2$, of Reagent purity.

Lead Subacetate, Strong Solution of : of the British Pharmacopœia.

Lead Subacetate, Solution of : *strong solution of lead subacetate* diluted, if necessary, with *water*.

Magenta : basic magenta of commerce.

Magenta, Decolourised Solution of : dissolve 1 gramme of *magenta* in 600 millilitres of hot *water*, and cool ; add 10 grammes of *anhydrous sodium sulphite*, dissolved in 100 millilitres of *water*, followed by 10 millilitres of *hydrochloric acid* ; dilute to 1000 millilitres.

Decolourised Solution of Magenta should be protected from light.

Magnesium Ammonio-Sulphate, Solution of : dissolve 10 grammes of *magnesium sulphate* and 20 grammes of *ammonium chloride* in 80 millilitres of *water* ; add 42 millilitres of *dilute solution of ammonia* ; set aside for a few days in a well-closed bottle ; decant, and filter.

Magnesium Chloride: $MgCl_2,6H_2O$, of Reagent purity.

Magnesium Oxide, Light: of the British Pharmacopœia.

Magnesium Sulphate: of the British Pharmacopœia.

Magnesium Sulphate, Solution of: a 10 per cent. w/v solution of *magnesium sulphate* in *water.*

Manganese Dioxide: MnO_2, of Reagent purity.

Mercuric Ammonium Thiocyanate, Solution of: dissolve 30 grammes of *ammonium thiocyanate* and 27 grammes of *mercuric chloride* in sufficient *water* to produce 1000 millilitres.

Mercuric Chloride: of the British Pharmacopœia.

Mercuric Chloride, Test-solution of: a 5 per cent. w/v solution of *mercuric chloride* in *water.*

Mercuric Oxide, Yellow: of the British Pharmacopœia.

Mercuric Sulphate, Solution of: mix 5 grammes of *yellow mercuric oxide* with 40 millilitres of *water,* and, while stirring, add 20 millilitres of *sulphuric acid*; add 40 millilitres of *water,* and stir until completely dissolved.

Mercury: of the British Pharmacopœia.

Mercury Nitrate, Solution of, *Synonym*—Millon's Reagent: dissolve 3 millilitres of *mercury* in 27 millilitres of *fuming nitric acid* without heat; dilute the solution with an equal volume of *water.*

Solution of Mercury Nitrate must be recently prepared.

Methyl Alcohol: CH_3OH, of Reagent purity.

Molybdic Acid: of Reagent purity.

Morphinated Water: shake *morphine* with *chloroform water,* and allow to stand for not less than seven days at ordinary temperature, shaking occasionally in order to obtain a saturated solution of the alkaloid; filter from the undissolved morphine, immediately before use.

Morphine: add *dilute solution of ammonia*, in slight excess, to a solution of a pure morphine salt in *water*; wash the precipitated morphine with *water*, until free from ammonium salts.

Morphine, Anhydrous: *morphine*, dried at 110°.

β-Naphthol: Betanaphthol of the British Pharmacopœia.

Nitric Acid: of the British Pharmacopœia (approximately 70 per cent. w/w of HNO_3).

Nitric Acid, Dilute: mix 106 millilitres of *nitric acid* with sufficient *water* to produce 1000 millilitres (approximately 10 per cent. w/w of HNO_3).

Nitric Acid, Fuming: *specific gravity* (15·5°/15·5°), about 1·5, of Reagent purity.

Nitric Oxide: NO, washed.

Oil of Turpentine: of the British Pharmacopœia.

Oleic Acid: of the British Pharmacopœia.

Olive Oil: of the British Pharmacopœia.

Oxalic Acid: $H_2C_2O_4,2H_2O$, of Reagent purity.

Oxalic and Sulphuric Acids, Solution of: a 5 per cent. w/v solution of *oxalic acid* in a cooled mixture of equal volumes of *sulphuric acid* and *water*.

Paraffin, Liquid: of the British Pharmacopœia.

Petroleum, Light, *Synonym*—Petroleum Spirit: a colourless, very volatile, highly inflammable liquid, obtained from petroleum, consisting of a mixture of the lower members of the paraffin series of hydrocarbons, and complying with one or other of the following definitions :—

Light petroleum (boiling-point, 40° to 50°), specific gravity (15·5°/15·5°), 0·620 to 0·690.

Light petroleum (boiling-point, 50° to 60°), specific gravity (15·5°/15·5°), 0·670 to 0·700.

Phenol : of the British Pharmacopœia.

Phenoldisulphonic Acid : heat 3 grammes of *phenol* with 20 millilitres of *sulphuric acid* on a water-bath for six hours ; transfer the resulting liquid to a stoppered bottle.

Phenylhydrazine Hydrochloride : $C_6H_5{\cdot}NH{\cdot}NH_2,HCl$, of Reagent purity.

Phloroglucinol : $C_6H_3(OH)_3$, of Reagent purity.

Phloroglucinol, Solution of : a 1 per cent. w/v solution of *phloroglucinol* in *alcohol* (90 *per cent.*).

Phosphoric Acid : of the British Pharmacopœia (approximately 89 per cent. w/w of H_3PO_4).

Phosphorus, Red : of Reagent purity.

Phosphorus Pentoxide : P_2O_5, of Reagent purity.

Platinic Chloride : $H_2PtCl_6,6H_2O$, of Reagent purity.

Platinic Chloride, Solution of : a 5 per cent. w/v solution of *platinic chloride* in *water.*

Potassio-Cupric Tartrate, Solution of, *Synonym*—Fehling's **Solution :**

No. 1. Dissolve 34·64 grammes of *copper sulphate* in a mixture of 0·50 millilitres of *sulphuric acid* and sufficient *water* to produce 500 millilitres.

No. 2. Dissolve 176 grammes of *sodium potassium tartrate* and 77 grammes of *sodium hydroxide* in sufficient *water* to produce 500 millilitres.

Mix equal volumes of the solutions No. 1 and No. 2, at the time of using.

Potassio-Mercuric Iodide, Solution of, *Synonym*—Mayer's Reagent : dissolve 1·355 grammes of *mercuric chloride* in 60 millilitres of *water* ; dissolve 5 grammes of *potassium iodide* in 20 millilitres of *water* ; mix the two solutions, and add sufficient *water* to produce 100 millilitres.

Potassio-Mercuric Iodide, Alkaline Solution of, *Synonym*—Nessler's Reagent : dissolve 3·5 grammes of *potassium iodide* and 1·25 grammes of *mercuric chloride* in 80 millilitres of *water* ; add a cold saturated solution of *mercuric chloride* in *water*, with constant stirring, until a slight red precipitate remains ; add 12 grammes of *sodium hydroxide*, and dissolve ; add a little more of the saturated solution of *mercuric chloride* and sufficient *water* to produce 100 millilitres. Allow it to stand, and decant the clear liquid.

Potassium Bisulphate : $KHSO_4$, of Reagent purity.

Potassium Bromate : $KBrO_3$, of Reagent purity.

Potassium Bromide : of the British Pharmacopœia.

Potassium Carbonate : of the British Pharmacopœia.

Potassium Carbonate, Solution of : a 10 per cent. w/v solution of *potassium carbonate* in *water.*

Potassium Carbonate, Anhydrous : K_2CO_3, of Reagent purity.

Potassium Chlorate : of the British Pharmacopœia.

Potassium Chloride : KCl, of Reagent purity.

Potassium Chromate : K_2CrO_4, of Reagent purity.

Potassium Chromate, Solution of : a 5 per cent. w/v solution of *potassium chromate* in *water.*

Potassium Citrate : of the British Pharmacopœia.

Potassium Cyanide : of commerce, containing the equivalent of about 98 per cent. of potassium cyanide, KCN.

Potassium Cyanide : Solution of : a 10 per cent. w/v solution of *potassium cyanide* in *water.*

Potassium Dichromate : $K_2Cr_2O_7$, of Reagent purity.

Potassium Dichromate, Solution of : a 7 per cent. w/v solution of *potassium dichromate* in *water.*

Potassium Ferricyanide : $K_3Fe(CN)_6$, of Reagent purity.

Potassium Ferricyanide, Solution of : wash about 1 gramme of *potassium ferricyanide,* in crystals, with a little *water,* and dissolve the washed crystals in 100 millilitres of *water.*

Solution of Potassium Ferricyanide must be freshly prepared.

Potassium Ferrocyanide : $K_4Fe(CN)_6,3H_2O$, of Reagent purity.

Potassium Ferrocyanide, Solution of : a 5 per cent. w/v solution of *potassium ferrocyanide* in *water.*

Potassium Hydroxide : of the British Pharmacopœia.

Potassium Hydroxide, Solution of : of the British Pharmacopœia (approximately 5 per cent. w/v of KOH).

Potassium Hydroxide, Alcoholic Solution of : a 10 per cent. w/v solution of *potassium hydroxide* in *alcohol* (*90 per cent.*).

Alcoholic Solution of Potassium Hydroxide must be recently prepared.

Potassium Iodate : KIO_3, of Reagent purity.

Potassium Iodide : of the British Pharmacopœia.

Potassium Iodide, Solution of : a 10 per cent. w/v solution of *potassium iodide* in *water.*

Potassium Iodide and Starch, Solution of : dissolve 10 grammes of *potassium iodide* in sufficient *water* to produce 95 millilitres ; add 5 millilitres of *mucilage of starch.*

Solution of Potassium Iodide and Starch must be freshly prepared.

Potassium Nitrate: of the British Pharmacopœia.

Potassium Permanganate: of the British Pharmacopœia.

Potassium Permanganate, Solution of: a 1 per cent. w/v solution of *potassium permanganate* in *water.*

Potassium Permanganate, Solution of, in Phosphoric Acid: dissolve 3 grammes of *potassium permanganate* in a mixture of 15 millilitres of *phosphoric acid* and 70 millilitres of *water*; add a sufficient quantity of *water* to produce 100 millilitres.

Potassium Plumbite, Solution of: dissolve 1·7 grammes of *lead acetate,* 3·4 grammes of *potassium citrate* and 50 grammes of *potassium hydroxide* in a sufficient quantity of *water* to produce 100 millilitres.

Potassium Sulphate: K_2SO_4, of Reagent purity.

Pumice Powder: the particles of pumice of commerce, powdered and sifted, which pass through a *No. 22 sieve,* but are retained by a *No. 60 sieve.*

Pyrogallol: $C_6H_3(OH)_3$, of Reagent purity.

Pyrogallol, Alkaline Solution of: dissolve 0·5 gramme of *pyrogallol* in 2 millilitres of *water*; dissolve 12 grammes of *potassium hydroxide* in 8 millilitres of *water.* Mix the two solutions, immediately before use.

Resorcinol: of the British Pharmacopœia.

Resorcinol, Solution of, in Hydrochloric Acid: a 1 per cent. w/v solution of *resorcinol* in *hydrochloric acid.*

Ruthenium Red: ammoniated ruthenium hydroxychloride, $Ru_2Cl_4(OH)_2$, $7NH_3$, $2H_2O$, of Reagent purity.

Ruthenium Red, Solution of: dissolve 0·008 gramme of *ruthenium red* in 10 millilitres of a 10 per cent. w/v solution of *lead acetate* in *water.*

Solution of Ruthenium Red must be freshly prepared.

Salicylic Acid : of the British Pharmacopœia.

Silver Ammonio-Nitrate, Solution of : dissolve 2·5 grammes of *silver nitrate* in 80 millilitres of *water*, and cautiously add *dilute solution of ammonia*, until the precipitate first formed is nearly dissolved; set aside; decant; add sufficient *water* to produce 100 millilitres.

Silver Nitrate : of the British Pharmacopœia.

Silver Nitrate, Alcoholic Solution of : dissolve 4 grammes of *silver nitrate* in 10 millilitres of *water*, and add a sufficient quantity of *alcohol (95 per cent.)* to produce 100 millilitres.

Silver Nitrate, Solution of : a 5 per cent. w/v solution of *silver nitrate* in *water*.

Soda Lime : of commerce, in small granules.

Sodium Acetate, Anhydrous : $C_2H_3O_2Na$, of Reagent purity.

Sodium Arsenate : Na_2HAsO_4, of Reagent purity.

Sodium Bicarbonate : of the British Pharmacopœia.

Sodium Bicarbonate, Solution of : a 5 per cent. w/v solution of *sodium bicarbonate* in *water*.

Sodium Bromide : of the British Pharmacopœia.

Sodium Carbonate : of the British Pharmacopœia.

Sodium Carbonate, Solution of : a 10 per cent. w/v solution of *sodium carbonate* in *water*.

Sodium Carbonate, Anhydrous : Na_2CO_3, of Reagent purity.

Sodium Chloride : of the British Pharmacopœia.

Sodium Chloride, Physiological Solution of : of the British Pharmacopœia.

Sodium Chloride, Solution of, *Synonym*—**Brine : a saturated solution of *sodium chloride* in *water*.**

Sodium Citrate: of the British Pharmacopœia.

Sodium Hydroxide: of the British Pharmacopœia.

Sodium Hydroxide, Solution of: a 20 per cent. w/v solution of *sodium hydroxide* in *water.*

Sodium Metabisulphite: $Na_2S_2O_5$, of Reagent purity.

Sodium Nitrite: of the British Pharmacopœia.

Sodium Nitroprusside: $Na_2Fe(CN)_5NO,2H_2O$, of Reagent purity.

Sodium Nitroprusside, Solution of: a 1 per cent. w/v solution of *sodium nitroprusside* in *water.*

Solution of Sodium Nitroprusside should be recently prepared.

Sodium Phosphate: of the British Pharmacopœia.

Sodium Phosphate, Solution of: a 10 per cent. w/v solution of *sodium phosphate* in *water.*

Sodium Potassium Tartrate: of the British Pharmacopœia.

Sodium Salicylate: of the British Pharmacopœia.

Sodium Sulphate: of the British Pharmacopœia.

Sodium Sulphate, Solution of: a 10 per cent. w/v solution of *sodium sulphate* in *water.*

Sodium Sulphate, Anhydrous: *sodium sulphate* rendered anhydrous by heat.

Sodium Sulphide: $Na_2S,9H_2O$, of Reagent purity.

Sodium Sulphide, Solution of: a 10 per cent. w/v solution of *sodium sulphide* in *water.*

Sodium Sulphite, Anhydrous: Na_2SO_3, of Reagent purity.

Sodium Thiosulphate: $Na_2S_2O_3,5H_2O$, of Reagent purity.

Stannous Chloride, Solution of: dilute 60 millilitres of *hydrochloric acid* with 20 millilitres of *water*; add 20 grammes of *tin*; heat gently, until gas ceases to be evolved; add sufficient *water* to produce 100 millilitres, allowing the undissolved *tin* to remain in the solution.

Starch: potato starch of commerce.

Starch-Iodate Paper: made by impregnating unglazed white paper with *mucilage of starch,* diluted with an equal volume of a 5 per cent. w/v solution of *potassium iodate* in *water.*

Starch-Iodide Paper: made by impregnating unglazed white paper with *mucilage of starch,* diluted with an equal volume of a 0·4 per cent. w/v solution of *potassium iodide* in *water.*

Starch, Soluble: Potato starch of commerce which has been treated with *hydrochloric acid,* until, after washing, it forms an almost clear limpid solution in hot water.

The reaction of a mixture of 1 gramme in 20 millilitres of freshly boiled and cooled *water* is between *p*H 6·5 and *p*H 8·0.

Mix 1 gramme with 5 millilitres of cold water, add 45 millilitres of boiling *water,* heat to 100° for two minutes, and cool. The solution complies with the following tests:—

> Boil 10 millilitres with 0·1 millilitre of *solution of potassio-cupric tartrate*; the solution remains slightly blue (limit of reducing substances).
>
> To 10 millilitres add 1 drop of *N/10 iodine*; a deep blue, but not a purple, colour is produced.

1 gramme shaken with 50 millilitres of *water,* and filtered, complies with the *limit test for chlorides.*

Loses, when dried at 100°, not more than 15 per cent. of its weight.

Sucrose: of the British Pharmacopœia.

Sulphur, Precipitated: of the British Pharmacopœia.

Sulphuric Acid: of the British Pharmacopœia (95 per cent. w/w to 98 per cent. w/w of H_2SO_4).

Sulphuric Acid, Dilute: of the British Pharmacopœia (approximately 10 per cent. w/w of H_2SO_4).

Sulphuric Acid, Fuming: of Reagent purity, containing 20 to 25 per cent. w/w of SO_3.

Sulphuric Acid, Nitrogen-free: of Reagent purity, containing 96 per cent. w/w of H_2SO_4.

Sulphurous Acid, Solution of: a 6·4 per cent. w/w solution of sulphurous acid in *water* (approximately 5 per cent. w/w of sulphur dioxide, SO_2).

Talc, Powdered: a natural magnesium silicate, powdered and purified by boiling with *dilute hydrochloric acid,* washing with *water,* until neutral to *litmus,* and drying.

Tannic Acid: of the British Pharmacopœia.

Tannic Acid, Solution of: a 10 per cent. w/v solution of *tannic acid* in *water.*

Tartaric Acid: of the British Pharmacopœia.

Tartaric Acid, Solution of: dissolve 12·5 grammes of *tartaric acid* in 60 millilitres of *water,* add 25 millilitres of *alcohol (90 per cent.),* and sufficient *water* to produce 100 millilitres.

Tin: granulated, of Reagent purity.

Titanous Chloride, Solution of: the solution of titanous chloride, of commerce, containing approximately 15 per cent. of $TiCl_3$.

Toluene: C_7H_8, of Reagent purity.

Tragacanth: of the British Pharmacopœia.

Trinitrophenol: of the British Pharmacopœia.

Trinitrophenol, Solution of: a 0·66 per cent. w/v solution of *trinitrophenol* in *water.*

Turmeric: the dried rhizome of *Curcuma longa* Linn.

Turmeric Paper: made by impregnating unglazed white paper with *tincture of turmeric.*

Turmeric, Tincture of: macerate 10 grammes of bruised *turmeric* in 60 millilitres of *alcohol (90 per cent.)* for one week; filter.

Vanillin: $HO{\cdot}C_6H_3(OCH_3)CHO$ $[CHO{:}OCH_3{:}OH = 1:3:4]$, of Reagent purity.

Water: Distilled Water of the British Pharmacopœia.

Water, Ammonia-free: *water* which complies with the following additional test:—to 50 millilitres add 2 millilitres of *alkaline solution of potassio-mercuric iodide*; no colour is produced.

Water, Sterilised: of the British Pharmacopœia.

Zinc: laminated, granulated or powdered zinc, of Reagent purity.

APPENDIX II

A. *SOLUTIONS EMPLOYED IN VOLUMETRIC DETERMINATIONS*

Solution of Ammonia, 2N.

Strong solution of ammonia, diluted with *water* to contain in 1000 millilitres 34·06 grammes of NH_3.

Solution of Ammonium Thiocyanate, N/10.

Ammonium thiocyanate, dissolved in *water* to contain in 1000 millilitres 7·611 grammes of NH_4SCN.

Solution of Bromine, N/10.

A solution of *potassium bromate* and *potassium bromide* in *water*; 1000 millilitres yields, when acidified, 7·992 grammes of Br.

Dissolve 3 grammes of *potassium bromate* and 50 grammes of *potassium bromide* in sufficient *water* to produce 1000 millilitres. Ascertain its exact strength by adding *potassium iodide* and a slight excess of *hydrochloric acid*, and titrating with *N/10 sodium thiosulphate.*

Decinormal Solution of Bromine should be kept in a dark amber-coloured, stoppered bottle.

Solution of Ferric Ammonium Sulphate, N/10.

Ferric ammonium sulphate, dissolved in *water* to contain in 1000 millilitres ferric iron equivalent to 5·584 grammes of Fe.

Solution of Hydrochloric Acid, 2N, N/1, N/2, N/10, N/50, N/100

Hydrochloric acid, diluted with *water* to contain in 1000 millilitres the following quantities of HCl :—

for 2N	72·93 grammes HCl
for N/1	36·46 grammes HCl
for N/2	18·23 grammes HCl
for N/10	3·646 grammes HCl
for N/50	0·7293 gramme HCl
for N/100	0·3646 gramme HCl

Solution of Iodine, N/10, N/50, N/100, N/1000.

Iodine and *potassium iodide,* dissolved in *water* to contain in 1000 millilitres the following quantities of I and KI :—

for N/10	12·69 grammes I and	18·00 grammes KI
for N/50	2·539 grammes I and	3·60 grammes KI
for N/100	1·269 grammes I and	1·80 grammes KI
for N/1000	0·1269 gramme I and	0·18 gramme KI

Solution of Oxalic Acid, N/1, N/10.

Oxalic acid, dissolved in *water* to contain in 1000 millilitres the following quantities of $H_2C_2O_4,2H_2O$:—

for N/1	63·02 grammes $H_2C_2O_4,2H_2O$
for N/10	6·302 grammes $H_2C_2O_4,2H_2O$

Solution of Potassium Dichromate, N/1, N/10.

Potassium dichromate, dissolved in *water* to contain in 1000 millilitres the following quantities of $K_2Cr_2O_7$:—

for N/1	49·04	grammes $K_2Cr_2O_7$
for N/10	4·904	grammes $K_2Cr_2O_7$

Solution of Potassium Hydroxide, Alcoholic, 2N, 1·5N, N/1, N/2, N/10.

Potassium hydroxide, dissolved in *alcohol* of the required strength to contain in 1000 millilitres the following quantities of KOH :—

for 2N	112·2	grammes KOH in *alcohol* (*95 per cent.*)
for 1·5N	84·16	grammes KOH in *alcohol* (*95 per cent.*)
for N/1	56·11	grammes KOH in *alcohol, dehydrated.*
for N/1	56·11	grammes KOH in *alcohol* (*90 per cent.*)
for N/2	28·05	grammes KOH in *alcohol* (*90 per cent.*)
for N/10	5·611	grammes KOH in *alcohol* (*90 per cent.*)

Solution of Potassium Hydroxide, Aqueous, N/1, N/2, N/10.

Potassium hydroxide, dissolved in *water* to contain in 1000 millilitres the following quantities of KOH :—

for N/1	56·11	grammes KOH
for N/2	28·05	grammes KOH
for N/10	5·611	grammes KOH

Solution of Potassium Iodate, M/5, M/20.

Potassium iodate, dissolved in *water* to contain in 1000 millilitres the following quantities of KIO_3 :—

for M/5	42·81	grammes KIO_3
for M/20	10·70	grammes KIO_3

Solution of Potassium Permanganate, N/1, N/10, N/50, N/100.

Potassium permanganate, dissolved in *water* to contain in 1000 millilitres the following quantities of $KMnO_4$:—

for N/1	31·61	grammes $KMnO_4$
for N/10	3·161	grammes $KMnO_4$
for N/50	0·6322	gramme $KMnO_4$
for N/100	0·3161	gramme $KMnO_4$

Solution of Silver Nitrate, N/10.

Silver nitrate, dissolved in *water* to contain in 1000 millilitres 16·99 grammes of $AgNO_3$.

Solution of Sodium Carbonate, N/1, N/10.

Sodium carbonate, dissolved in *water* to contain in 1000 millilitres the following quantities of Na_2CO_3:—

for N/1	53·00	grammes Na_2CO_3
for N/10	5·300	grammes Na_2CO_3

Solution of Sodium Hydroxide, 2N, N/1, N/2, N/5, N/10, N/20, N/50, N/100.

Sodium hydroxide, dissolved in *water* to contain in 1000 millilitres the following quantities of NaOH :—

for 2N	80·01	grammes NaOH
for N/1	40·00	grammes NaOH
for N/2	20·00	grammes NaOH
for N/5	8·001	grammes NaOH
for N/10	4·000	grammes NaOH
for N/20	2·000	grammes NaOH
for N/50	0·800	gramme NaOH
for N/100	0·400	gramme NaOH

Solution of Sodium Thiosulphate, N/10, N/200, N/500.

Sodium thiosulphate, dissolved in *water* to contain in 1000 millilitres the following quantities of $Na_2S_2O_3,5H_2O$:—

for N/10	24·82	grammes $Na_2S_2O_3,5H_2O$
for N/200	1·241	grammes $Na_2S_2O_3,5H_2O$
for N/500	0·4964	gramme $Na_2S_2O_3,5H_2O$

Solution of Sulphuric Acid, N/1, N/2, N/5, N/10, N/20, N/50, N/100, N/1000.

Sulphuric acid, diluted with *water* to contain in 1000 millilitres the following quantities of H_2SO_4 :—

for N/1	49·04	grammes H_2SO_4
for N/2	24·52	grammes H_2SO_4
for N/5	9·808	grammes H_2SO_4
for N/10	4·904	grammes H_2SO_4
for N/20	2·452	grammes H_2SO_4
for N/50	0·9808	gramme H_2SO_4
for N/100	0·4904	gramme H_2SO_4
for N/1000	0·0490	gramme H_2SO_4

Solution of Titanous Chloride N/10.

Solution of titanous chloride, diluted with *hydrochloric acid* and *water* to contain in 1000 millilitres 15·427 grammes of $TiCl_3$.

Mix 103 millilitres of *solution of titanous chloride* with 103 millilitres of *hydrochloric acid*, and add a sufficient quantity of recently boiled and cooled *water* to produce 1000 millilitres. Standardise the solution, immediately before use, by titrating with it, in an atmosphere of carbon dioxide, *N/10 ferric ammonium sulphate* acidified with *dilute sulphuric acid*, using *solution of ammonium thiocyanate* as indicator.

Solution of titanous chloride N/10 must be kept in a completely filled bottle, or in an atmosphere of hydrogen or of carbon dioxide.

B. *INDICATORS EMPLOYED IN VOLUMETRIC DETERMINATIONS AND IN pH DETERMINATIONS*

Alkali Blue : a mixture of the sodium sulphonates of phenylated rosaniline and para-rosaniline.

Alkali Blue, Solution of : a 0·1 per cent. w/v solution of *alkali blue* in *alcohol (90 per cent.)*.

Bromocresol Green : tetrabromo-*m*-cresolsulphonephthalein, of Reagent purity.

Bromocresol Green, Solution of : warm 0·1 gramme of *bromocresol green* with 2·9 millilitres of *N/20 sodium hydroxide* and 5 millilitres of *alcohol (90 per cent.)*; after solution is effected, add a sufficient quantity of *alcohol (20 per cent.)* to produce 250 millilitres.

Bromocresol Purple : dibromo-*o*-cresolsulphonephthalein, of Reagent purity.

Bromocresol Purple, Solution of : warm 0·1 gramme of *bromocresol purple* with 3·7 millilitres of *N/20 sodium hydroxide* and 5 millilitres of *alcohol (90 per cent.)*; after solution is effected, add a sufficient quantity of *alcohol (20 per cent.)* to produce 250 [illegible]litres.

Bromophenol Blue : tetrabromophenolsulphonephthalein, of Reagent purity.

Bromophenol Blue, Solution of : warm 0·1 gramme of *bromophenol blue* with 3·0 millilitres of *N/20 sodium hydroxide* and 5 millilitres of *alcohol (90 per cent.)*; after solution is effected, add a sufficient quantity of *alcohol (20 per cent.)* to produce 250 millilitres.

Bromothymol Blue : dibromothymolsulphonephthalein, of Reagent purity.

Bromothymol Blue, Solution of : warm 0·1 gramme of *bromothymol blue* with 3·2 millilitres of *N/20 sodium hydroxide* and 5 millilitres of *alcohol (90 per cent.)*; after solution is effected, add a sufficient quantity of *alcohol (20 per cent.)* to produce 250 millilitres.

Cochineal, Tincture of : of the British Pharmacopœia.

Congo-red : sodium diphenylbisazobisnaphthylamine-4-sulphonate, $(\cdot C_6H_4\cdot N : N\cdot C_{10}H_5(NH_2)SO_3Na)_2$, of commerce.

Congo-red Paper : made by impregnating unglazed white paper with a solution of *congo red.*

Cresol Red : *o*-cresolsulphonephthalein, of Reagent purity.

Cresol Red, Solution of : warm 0·05 gramme of *cresol red* with 2·65 millilitres of *N/20 sodium hydroxide* and 5 millilitres of *alcohol (90 per cent.)*; after solution is effected, add a sufficient quantity of *alcohol (20 per cent.)* to produce 250 millilitres.

Dimethyl Yellow : dimethylaminoazobenzene, of Reagent purity.

Dimethyl Yellow, Solution of : a 0·2 per cent. w/v solution of *dimethyl yellow* in *alcohol (90 per cent.)*.

Diphenylamine : $(C_6H_5)_2NH$, of Reagent purity.

Diphenylamine, Solution of : a 1 per cent. w/v solution of *diphenylamine* in *nitrogen-free sulphuric acid.*

Ferric Ammonium Sulphate, Solution of : a 10 per cent. w/v solution of *ferric ammonium sulphate* in *water.*

Hæmatoxylin : of Reagent purity.

Hæmatoxylin, Solution of : a 1 per cent. w/v solution of *hæmatoxylin* in *alcohol (60 per cent.).*

Litmus : a blue pigment, prepared from various species of *Roccella* DC.

Litmus Paper, Blue : made by impregnating unglazed white paper with a solution of *litmus.*

Litmus Paper, Red : made by impregnating unglazed white paper with a solution of *litmus*, reddened by the previous addition of a very minute quantity of *sulphuric acid.*

Litmus, Solution of : boil 10 grammes of *litmus* with 40 millilitres of *alcohol (90 per cent.)* for one hour, and pour away the clear liquid; repeat this operation twice with 30 millilitres of *alcohol (90 per cent.)* Digest the washed litmus with 100 millilitres of *water*, and filter.

Methyl Orange : sodium dimethylaminoazobenzenesulphonate, of Reagent purity.

Methyl Orange, Solution of : a 0·04 per cent. w/v solution of *methyl orange* in *alcohol (20 per cent.).*

Methyl Red : dimethylaminoazobenzene-*o*-carboxylic acid, of Reagent purity.

Methyl Red, Solution of: warm 0·025 gramme of *methyl red* with 0·95 millilitre of *N/20 sodium hydroxide* and 5 millilitres of *alcohol (90 per cent.)*; after solution is effected, add a sufficient quantity of *alcohol (20 per cent.)* to produce 250 millilitres.

Phenolphthalein: of the British Pharmacopœia.

Phenolphthalein, Solution of: dissolve 0·2 gramme of *phenolphthalein* in 60 millilitres of *alcohol (90 per cent.)*, and add a sufficient quantity of *water* to produce 100 millilitres.

Phenol Red: phenolsulphonephthalein, of Reagent purity.

Phenol Red, Solution of: warm 0·05 gramme of *phenol red* with 2·85 millilitres of *N/20 sodium hydroxide* and 5 millilitres of *alcohol (90 per cent.)*; after solution is effected, add a sufficient quantity of *alcohol (20 per cent.)* to produce 250 millilitres.

Phenol Violet, Solution of: warm 0·15 gramme of *thymol blue* and 0·025 gramme of *phenolphthalein* with 3·25 millilitres of *N/10 sodium hydroxide* and 5 millilitres of *alcohol (90 per cent.)*; after solution is effected, add a sufficient quantity of *alcohol (20 per cent.)* to produce 250 millilitres.

Starch, Mucilage of: triturate 0·5 gramme of *starch*, or 2 grammes of *soluble starch*, with 5 millilitres of *water*, and add this, with constant stirring, to sufficient *water* to produce about 100 millilitres. Boil for a few minutes, cool, and filter.

Mucilage of Starch must be recently prepared.

Thymol Blue: thymolsulphonephthalein, of Reagent purity.

Thymol Blue, Solution of: warm 0·1 gramme of *thymol blue* with 4·3 millilitres of *N/20 sodium hydroxide* and 5 millilitres of *alcohol (90 per cent.)*; after solution is effected, add a sufficient quantity of *alcohol (20 per cent.)* to produce 250 millilitres.

C. *COLOUR CHANGES OF INDICATORS*

Alkali Blue changes from blue to red with strong alkali in alcoholic solution.

Bromophenol Blue gives a yellow colour in moderately acid solutions, and a blue-violet colour in weakly acid and alkaline solutions (*p*H range, 2·8 to 4·6).

Bromocresol Green gives a yellow colour in moderately acid solutions, and a blue colour in weakly acid and alkaline solutions (*p*H range, 3·6 to 5·2).

Bromothymol Blue gives a yellow colour in weakly acid solutions, and a blue colour in weakly alkaline solutions. Neutrality is indicated by a green colour (*p*H range, 6·0 to 7·6).

Tincture of Cochineal gives a brownish-yellow colour in moderately acid solutions, and a purple colour in weakly acid and alkaline solutions (*p*H range, 5 to 6).

Congo-red gives a blue colour in moderately acid solutions, and a red colour in weakly acid and alkaline solutions (*p*H range, 3 to 5).

Dimethyl Yellow gives a red colour in moderately acid alcoholic solutions, and a yellow colour in weakly acid and alkaline solutions (*p*H range, 2·8 to 4).

Diphenylamine, in solutions containing sulphuric acid, gives a blue colour with nitric acid and other oxidising agents. When this indicator is used in the titration of a ferrous salt with potassium dichromate, the colour of the solution changes from bluish-green to dark blue, when the oxidation is complete.

Ferric Ammonium Sulphate gives a deep red colour with ammonium thiocyanate.

Hæmatoxylin gives a yellow colour in moderately acid solutions, and a green or purple colour in weakly acid and alkaline solutions.

Litmus gives a red colour with acids, and a blue colour with alkalis (*p*H range, 5 to 8).

Methyl Orange gives a red colour in moderately acid solutions, and a yellow colour in weakly acid and alkaline solutions (*p*H range, 2·8 to 4).

Methyl Red gives a red colour in weakly acid solutions, and a yellow colour in very weakly acid and alkaline solutions (*p*H range, 4·2 to 6·3).

Phenolphthalein forms a colourless solution in acid and weakly alkaline solutions, and gives a red colour in more strongly alkaline solutions (*p*H range, 8·3 to 10).

Phenol Red gives a yellow colour in neutral and very faintly acid solutions, and a red colour in weakly alkaline solutions (*p*H range, 6·8 to 8·4).

Phenol Violet gives a yellow colour in acid and weakly alkaline solutions, and, as the alkalinity increases, a blue colour and finally a violet colour (*p*H range, 8 to 10).

Potassium Chromate gives a red precipitate with silver nitrate in neutral solutions.

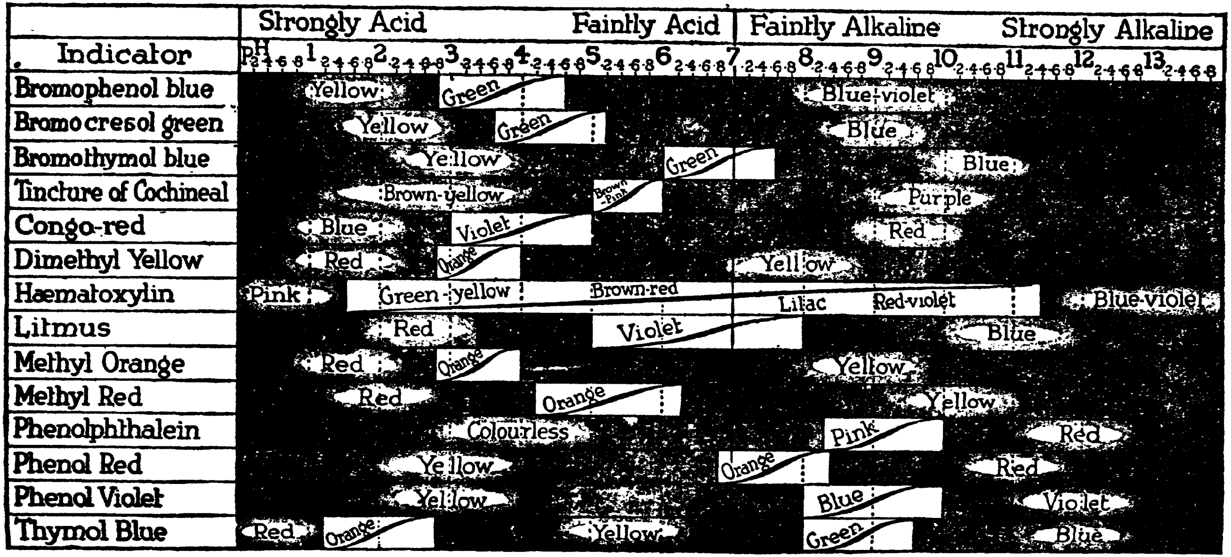
Potassium Ferricyanide gives a blue colour with solutions of ferrous salts.

Starch, Mucilage of, gives a blue colour with free iodine in the presence of a soluble iodide.

Thymol Blue gives a red colour in strongly acid solutions, a yellow colour in weakly acid and weakly alkaline solutions, and a blue colour in more strongly alkaline solutions (*p*H range, 1·2 to 2·8, and 8·0 to 9·6).

This diagram illustrates the colour changes of indicators, which may be employed in the acidimetric or alkalimetric titrations of the Pharmacopœia, and the pH values at which the colour changes take place. The curved lines represent the ranges of pH values, over which the change of colour occurs. Within these ranges the change is gradual from the acid to the alkaline colour of the indicator, or vice versa.

Indicators, having approximately the same range of colour change, may be substituted for one another. The recommendation of an indicator in the Pharmacopœia does not preclude the use of an indicator having the same range of colour change, but where any doubt exists as to the equivalence of indicators for a particular purpose, the indicator specified in the text must be used.



APPENDIX III

DETERMINATION OF *p*H VALUES

The *p*H value is the common logarithm of the reciprocal of the concentration of hydrogen ions expressed as grammes per litre in an aqueous liquid ; it is a quantitative indication of the reaction, that is, of the acidity, or of the alkalinity, of the solution.

The *p*H value of a liquid may be determined by comparing the colour, produced on the addition of a suitable indicator, with the colours, produced by the addition of the same proportion of the same indicator to standard solutions of known *p*H values.

Method of Procedure.

In a hard-glass test-tube place a measured volume of the liquid to be tested, and add an accurately measured volume of the solution of the specified indicator, usually about one-twentieth of the volume of the liquid being tested, and mix the solutions. At the same time mix in test-tubes of similar dimensions similar volumes of solutions of standard *p*H with the solution of the indicator, and compare the colours of these liquids with that of the mixture containing the liquid being tested. The *p*H of the liquid being tested is the same as that of the solution of standard *p*H which is of the same colour.

If the liquid being tested is turbid, or slightly coloured, compensation must be made for the inherent turbidity or colour. This is accomplished in the following manner :—

In front of the test-tube, containing the liquid being tested and the indicator, place a test-tube filled with *water* ; in front of the test-tube, containing the mixed solution of standard *p*H and indicator, place a test-tube filled with the liquid being tested. Compare the colours by looking through the two pairs of test-tubes. Tests may be carried out in hard glass or

Method of Adjusting a Liquid to a Definite pH Value.

Determine the *p*H value, of the liquid by the method described above. To the liquid add, in small quantities at a time, acid or alkali of the specified strength, and determine the *p*H value of the liquid after each addition ; continue the addition, until the required *p*H value is attained.

The following table gives a list of indicators suitable for the determination of *p*H values, together with the ranges to which they may be applied, and their colour changes :—

Thymol Blue (acid range) . . .	*p*H 1·2 to *p*H 2·8, red to yellow.
Bromophenol Blue .	*p*H 2·8 to *p*H 4·6, yellow to violet.
Bromocresol Green .	*p*H 3·6 to *p*H 5·2, yellow to blue.
Methyl Red . .	*p*H 4·2 to *p*H 6·3, red to yellow.
Bromocresol Purple .	*p*H 5·2 to *p*H 6·8, yellow to purple.
Bromothymol Blue .	*p*H 6·0 to *p*H 7·6, yellow to blue.
Phenol Red . .	*p*H 6·8 to *p*H 8·4, yellow to red.
Cresol Red. . .	*p*H 7·2 to *p*H 8·8, yellow to red.
Thymol Blue (alkali range) . . .	*p*H 8·0 to *p*H 9·6, yellow to blue.

REAGENTS

Potassium Chloride : pure recrystallised potassium chloride, KCl.

Potassium Dihydrogen Phosphate : pure recrystallised potassium dihydrogen phosphate, KH_2PO_4.

Potassium Hydrogen Phthalate : pure recrystallised potassium hydrogen phthalate, $COOH{\cdot}C_6H_4{\cdot}COOK$.

Boric Acid : H_3BO_3, of Reagent purity.

N/5 Sodium Hydroxide : *N/5 sodium hydroxide,* free from carbonate.

N/5 Hydrochloric Acid : *hydrochloric acid,* diluted with freshly boiled and cooled *water* to contain in 1000 millilitres 7·293 grammes of HCl.

M/5 Potassium Chloride : *potassium chloride,* dissolved in freshly boiled and cooled *water* to contain in 1000 millilitres 14·911 grammes of KCl.

M/5 Potassium Dihydrogen Phosphate : *potassium dihydrogen phosphate,* dissolved in freshly boiled and cooled *water* to contain in 1000 millilitres 27·227 grammes of KH_2PO_4.

M/5 Potassium Hydrogen Phthalate : *potassium hydrogen phthalate,* dissolved in freshly boiled and cooled *water* to contain in 1000 millilitres 40·828 grammes of $KHC_8H_4O_4$.

M/5 Boric Acid Potassium Chloride : *boric acid* and *potassium chloride,* dissolved in freshly boiled and cooled *water* to contain in 1000 millilitres 12·405 grammes of H_3BO_3 and 14·911 grammes of KCl.

SOLUTIONS OF STANDARD *p*H

Solutions from *p*H 1·2 to *p*H 2·2 are prepared by mixing 50 millilitres of *M/5 potassium chloride* with the quantities of *N/5 hydrochloric acid,* specified in the following table, and diluting with freshly boiled and cooled *water* to produce 200 millilitres :—

*p*H.	Millilitres of *N/5 hydrochloric acid.*
1·2	64·5
1·4	41·5
1·6	26·3
1·8	16·6
2·0	10·6
2·2	6·7

Solutions from *p*H 2·2 to *p*H 3·8 are prepared by mixing 50 millilitres of *M/5 potassium hydrogen phthalate* with the quantities of *N/5 hydrochloric acid,* specified in the following table, and diluting with freshly boiled and cooled *water* to produce 200 millilitres :—

*p*H.	Millilitres of *N/5 hydrochloric acid.*
2·2	46·70
2·4	39·60
2·6	32·95
2·8	26·42
3·0	20·32
3·2	14·70
3·4	9·90
3·6	5·97
3·8	2·62

Solutions from *p*H 4·0 to *p*H 6·2 are prepared by mixing 50 millilitres of *M/5 potassium hydrogen phthalate* with the quantities of *N/5 sodium hydroxide,* specified in the following table, and diluting with freshly boiled and cooled *water* to produce 200 millilitres :—

*p*H.	Millilitres of *N/5 sodium hydroxide.*
4·0	0·40
4·2	3·70
4·4	7·50
4·6	12·15
4·8	17·70
4·9	20·75
5·0	23·85
5·1	26·95
5·2	29·95
5·4	35·45
5·44	36·45
5·6	39·85
5·8	43·00
6·0	45·45
6·2	47·00

Solutions from *p*H 5·8 to *p*H 8·0 are prepared by mixing 50 millilitres of *M/5 potassium dihydrogen phosphate* with the quantities of *N/5 sodium hydroxide,* specified in the following table, and diluting with freshly boiled and cooled *water* to produce 200 millilitres :—

*p*H.	Millilitres of *N/5 sodium hydroxide.*
5·8	3·72
6·0	5·70
6·2	8·60
6·4	12·60
6·6	17·80
6·8	23·65
7·0	29·63
7·2	35·00
7·4	39·50
7·6	42·80
7·8	45·20
8·0	46·80

Solutions from *p*H 7·8 to *p*H 10·0 are prepared by mixing 50 millilitres of *M/5 boric acid potassium chloride* with the quantities of *N/5 sodium hydroxide,* specified in the following table, and diluting with freshly boiled and cooled *water* to produce 200 millilitres :—

*p*H.	Millilitres of $N/5$ *sodium hydroxide.*
7·8	2·61
8·0	3·97
8·2	5·90
8·4	8·50
8·6	12·00
8·8	16·30
9·0	21·30
9·2	26·70
9·4	32·00
9·6	36·85
9·8	40·80
10·0	43·90

Solutions of Standard *p*H must be kept in bottles of alkali-free glass.

APPENDIX IV

A. *DETERMINATION OF FREEZING-POINT, OF MELTING-POINT, AND OF SOLIDIFYING-POINT*

I. *Melting-point of substances readily reduced to a powder.*

Apparatus :—The apparatus used consists of the following parts :—

(*a*) A round-bottomed glass heating-tube, about 30 to 40 millimetres in diameter and about 100 to 200 millimetres in length, the length depending upon the length of the thermometer.

(*b*) A suitable stirring device, capable of movement from the top to the bottom of the liquid.

(*c*) Accurately standardised thermometers, either (1) of the short-stem type, each covering a range of about 50°, the length of one degree on the scale being 1·5 to 2 millimetres, or (2) of the '100 millimetre immersion' type, covering the ranges (i) 0° to 110°, (ii) 85° to 215°, and (iii) 190° and upwards, and conforming with the specification given under *determination of boiling-point*.

(*d*) Thin-walled capillary glass tubes, closed at one end, of an internal diameter of about 1 millimetre, and of sufficient length to allow the open end to be above the surface of the liquid in the heating-tube.

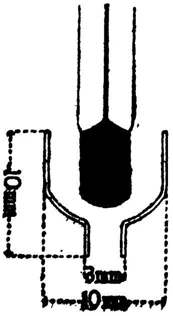
Method of Determination. Dry a small quantity of the powdered substance at a temperature considerably below its melting-point, unless otherwise directed; transfer a portion to a capillary tube, shaking the powder down to the sealed extremity. Attach the tube to the thermometer so that the substance is near the middle of the bulb. Heat a suitable liquid in the heating-tube to a temperature of about 10° below the melting-point of the substance. Introduce the thermometer with attached tube in such a way as to ensure that, when the melting-point of the substance is reached, either the whole of the mercury column is immersed, if a short-stem thermometer is used, or the level of the liquid is at the immersion mark, if a '100 millimetre immersion' thermometer is used. Carefully regulate the rate of rise of temperature to about 2° per minute, unless otherwise directed, and, whilst stirring, note the temperature at which liquefaction occurs, usually indicated by the substance becoming transparent, and by a definite meniscus being formed. This temperature is regarded as the melting-point of the substance. When the melting-point in the text is expressed as a range, the melting-point of the substance being tested must fall within that range.

Suitable Liquids for use in the Heating-tube.

(*a*) A liquid paraffin of sufficiently high boiling-point.
(*b*) Sulphuric acid to which nitric acid in the proportion of about 4 drops per 100 millilitres has been added.
(*c*) For high temperatures, 30 parts of potassium sulphate dissolved, by heat, in 70 parts of sulphuric acid.

II. *Melting-point of Hydnocarpus Oil, Lard, Soft Paraffin, and Wool Fat.*

Fill with the substance a cup of thin glass of the form and approximate size illustrated in the diagram, and having an opening at the bottom exactly 3 millimetres in diameter, and attach it by any suitable means, such as spring clips, to a thermometer so that the bulb of the thermometer is completely immersed in the substance in the centre of the cup, but without obstructing the narrow opening. The bulb of the thermometer should be about 4 millimetres in diameter and about 6 millimetres in length.



Fit the thermometer with the cup

attached into a test-tube, about 30 millimetres in diameter and 125 millimetres in length, by means of a bored cork. Immerse the whole in a water-bath, which is heated so that the temperature rises at the rate of 2° per minute. The temperature at which the first drop of melted liquid falls from the lower end of the cup is regarded as the melting-point of the substance.

Synthetic menthol 1948

III. *Melting-point of Oil of Theobroma, Suet, White Beeswax and Yellow Beeswax.*

The apparatus and method described under I, with the following modifications, are employed :—

The substance is introduced, preferably without melting, into a capillary tube about 0·75 millimetre to 1 millimetre in diameter.

If the substance has been heated, the tube is allowed to stand for not less than twenty-four hours at ordinary temperature, or is kept for not less than two hours at 0°, before the determination of the melting-point ; Oil of Theobroma is allowed to stand for not less than seventy-two hours at ordinary temperature.

The temperature at which the substance, after softening, becomes transparent throughout is regarded as the melting-point of the substance, and must be within the range specified in the text.

IV. *Freezing-point and Melting-point of Eucalyptol, Glacial Acetic Acid, Guaiacol, Menthol, Oil of Anise, Paraldehyde, and Phenol.* Benzyl Benzoate 45 E · Thymol, E

APPARATUS. (*a*) A stout-walled test-tube, about 30 millimetres in diameter and 125 millimetres in length, fitted, by means of a bored cork, into a wide-mouthed jar or bottle of about 500 millilitres capacity.

(*b*) A smaller stout-walled test-tube, about 20 millimetres in diameter and 100 millimetres in length, fitted, by means of a bored cork or a thick paper washer, into the larger tube.

METHOD OF DETERMINATION. *Freezing-point.* Cool a few millilitres of the liquid in a small test-tube, and stir with a thermometer until solidification takes place ; note the temperature, and set aside the tube with its contents in a cool place. Fill the outer container of the apparatus with *water*, or *solution of sodium chloride*, at a temperature about 5 degrees lower than that indicated by the thermometer in the preliminary test, described above, and fit the larger outer tube in its place. In the inner tube place 10 millilitres of the liquid, insert the thermometer, and cool the tube with its contents carefully to the temperature indicated above, and then insert the tube in its place in the apparatus, and allow the temperature to fall a further 1 or 2 degrees. Add to the liquid a trace of the material, previously solidified in the preliminary test, and stir the liquid vigorously with the thermometer until solidification takes place. The highest temperature reached during solidification is regarded as the freezing-point.

Melting-point. After the determination of the freezing-point, remove the inner and outer tubes together from the outer container, and allow the temperature to rise slowly, the liquid being stirred continuously with the thermometer, until the liquid becomes transparent, and any crystals remaining unmelted change from a dull to a glistening appearance. Note the temperature. This temperature is regarded as the melting-point. If necessary, the temperature may be raised by holding the outer tube in the hand, or, in the case of a high or low melting-point, the rise of temperature may be controlled by the use of a liquid at a suitable temperature in the outer container.

V. *Melting-point of Hard Paraffin.* and Cetostearyl Alc.

Place in a test-tube about 25 millimetres in diameter, or in the inner test-tube of the apparatus described under IV, a sufficient quantity of the melted paraffin to fill the tube to the depth of about 50 millimetres. Stir the paraffin gently and steadily with a small thermometer, avoiding scraping of the wall of the tube, while the tube and its contents are allowed to cool. The temperature at which the level of the mercury in the thermometer remains stationary for a short time is regarded as the melting-point.

VI. *Solidifying-point of the Fatty Acids in Soaps.*

Transfer about 30 millilitres of the melted fatty acids to a test tube, about 25 millilitres in diameter, which is fitted into a wide-mouthed bottle or other suitable form of air-jacket, so that the whole of the fatty acids are surrounded evenly by the air-jacket. Stir the fatty acids gently with a thermometer during cooling, avoiding contact of the thermometer with the sides of the tube. Observe the point at which the level of the mercury in the thermometer rises sharply or remains stationary. The temperature indicated by the highest point reached, or by the stationary point, is the solidifying-point.

B. *DETERMINATION OF BOILING-POINT*

Sec

The boiling-point of a substance is the range of temperature within which the whole, or a specified portion, of the substance distils.

The specification of the apparatus and method is in agreement in all essentials with the British Standard Specification No 3D. 15. 1930, except that the hole in the asbestos diaphragm of the draught screen is 3 centimetres, instead of 5 centimetres.

APPARATUS. The apparatus consists of the following parts (see figure, page 533):—

(*a*) *Distillation Flask.* A distillation flask made of good quality resistance glass. The bulb of the flask is spherical in shape, the side tube slopes downwards from the junction with the neck so that the angle between the side tube and the neck is from 72° to 78°, and the flange at the top of the neck is turned over sharply, the mouth of the neck not being belled to any considerable distance from the top of the neck. The dimensions of the flask (see figure, page 535) are as follows:—

Distillation Capacity[1] (V) .	100 millilitres
Capacity of Bulb (V^1) . .	125 to 135 millilitres
Internal Diameter of Neck (D)	15 to 17 millimetres
Internal Diameter of Side Tube (d_1)	3·5 to 4·5 millimetres
External Diameter of Side Tube (d_2)	5·5 to 6·5 millimetres
Length of Side Tube (L) . .	97 to 103 millimetres
Radius of Curvature at Base of neck[2] (r)	10 millimetres

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[1] The distillation capacity is the maximum volume of liquid which the bulb of the flask can satisfactorily accommodate for distillation.

[2] The radius of curvature at the base of the neck should not be too small and so make a sharp angle between the neck and the bulb; on the other hand the radius should not be so large as to make the bulb appreciably 'pear-shaped'. The radius given is for the guidance of manufacturers, but no rigid tolerances have been fixed.

Thickness of Walls of Bulb, Neck and Side Tube . . .	0·8 to 1·2 millimetres
Distance (l_1) from centre of Side Tube at junction with neck to top of neck	72 to 78 millimetres
Distance (l_2) from centre of Side Tube at junction with neck to liquid surface, when flask is vertical and contains a quantity of liquid equal in volume to the distillation capacity of the flask	87 to 93 millimetres

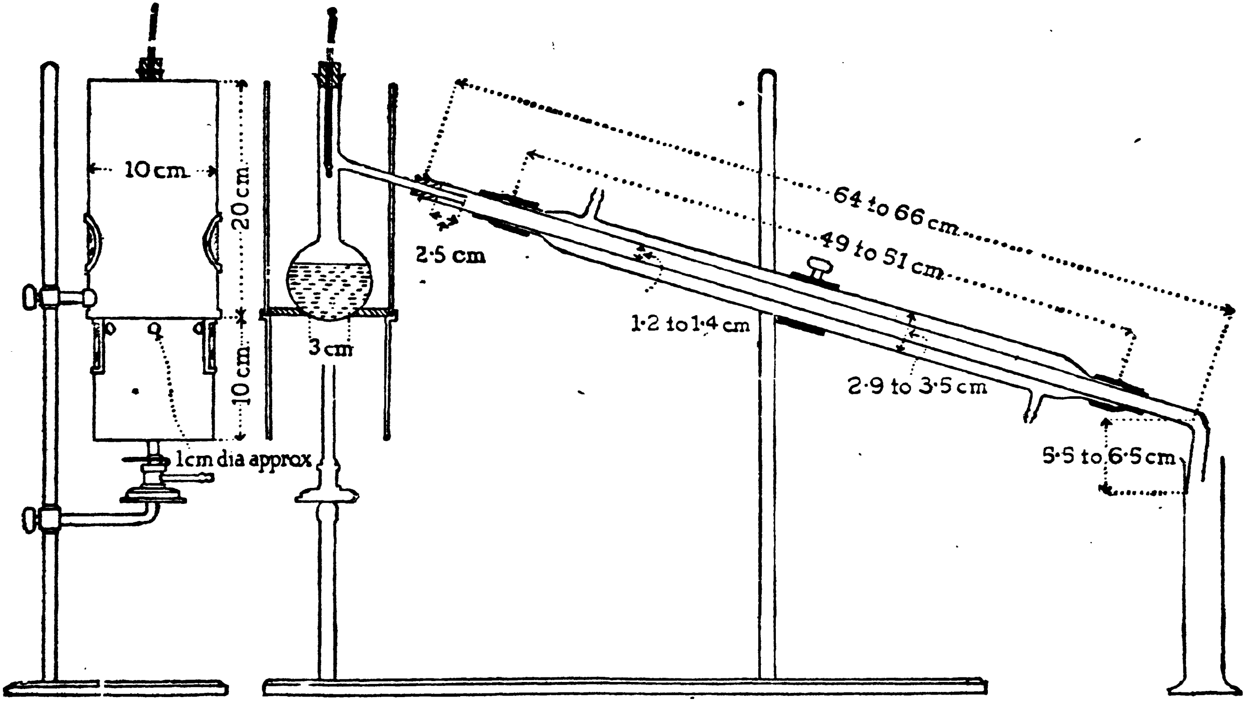
(*b*) *Glass Condenser.* A glass condenser, the inner glass tube of which is bent at one end as shown in the figure (page 533), one limb being 64 to 66 centimetres in length and the other 5·5 to 6·5 centimetres in length. The internal diameter of this tube is 1·2 to 1·4 centimetres. The outlet limb is cut off at an acute angle and is bent downwards so that its lower end touches the side of the receiver when the latter is placed in position, as shown in the figure (page 533). The outer jacket through which tap-water flows is 2·9 to 3·5 centimetres in diameter and 49 to 51 centimetres in length. For liquids boiling at temperatures above 150°, the water is drained from the outer jacket, which then acts as an air-condenser.

(*c*) *Receiver.* A receiver, consisting of a 100 millilitre graduated cylinder, subdivided into 1 millilitre intervals.

(*d*) *Bunsen Burner.* A Bunsen burner provided with a sensitive regulating tap.

(*e*) *Draught-Screen.* A cylindrical metal draught-screen, divided by a diaphragm of soft asbestos millboard 6 millimetres in thickness having a circular hole 3 centimetres in diameter in the centre, the support for the asbestos diaphragm being such that the diameter of the hole therein is greater than that in the asbestos diaphragm. The lower portion of the screen is provided with six draught holes, approximately 1 centimetre in diameter, and with mica windows for observing the flame. The upper portion has a slit to admit the side tube of the flask. The top is not closed by a lid.

(*f*) *Thermometers.* Three accurately-standardised thermometers covering the ranges, (i) 0° to 110°, (ii) 85° to 215°, (iii) 190° and upwards. These thermometers are of the mercury-in-glass, solid stem type. The bulb is cylindrical



DISTILLATION APPARATUS

in shape, and made of approved thermometric glass suitable for the range of temperature covered. Each thermometer is fitted with a safety chamber. The thermometers are calibrated for 100 millimetres immersion, and this is clearly indicated by a line etched on the stems and by engraving upon the instruments the words '100 mm. immersion' The graduation lines are clearly etched and of fine and uniform thickness suitable for reading without optical aid. The dimensions of the thermometers are as follows:—

Stem diameter . .	5·5 to 7 millimetres.
Bulb length . .	10 to 15 millimetres.
Bulb diameter . .	Not greater than that of stem.
Overall length . .	Not greater than 310 millimetres.
Length of graduated portion . . .	Not less than 160 millimetres.
Distance of lowest division to bottom of bulb . . .	105 to 115 millimetres.

METHOD OF DETERMINATION. 100 millilitres of the liquid is placed in the flask, and a few small pieces of clean porous pot added.

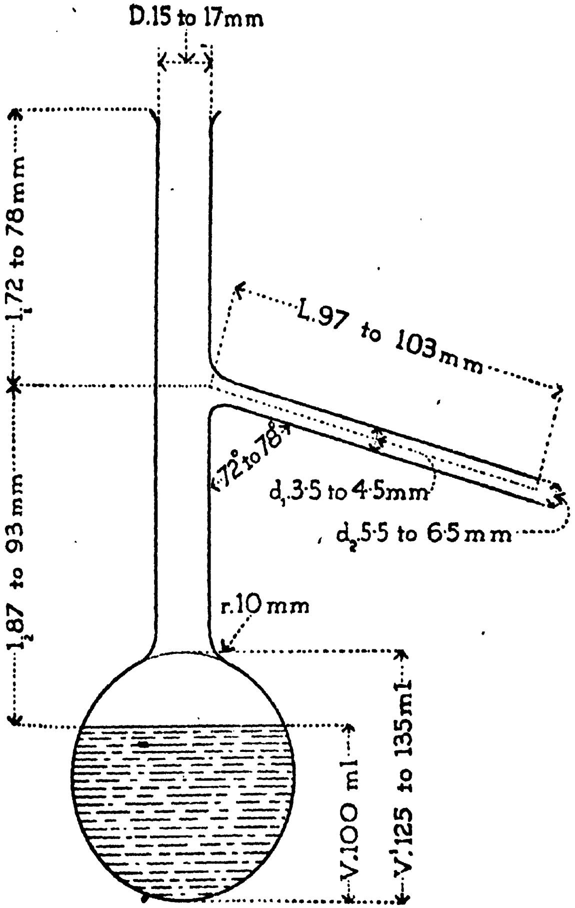
The thermometer is held concentrically in the neck of the flask by means of a well-fitting cork, with the bottom of the capillary tube of the thermometer level with the lower edge of the side tube.

The thermometer is standardised for 100 millimetres immersion and the immersion is the distance from the bottom of the bulb of the thermometer to the top of the cork holding the thermometer. For the Standard thermometer and flask specified, the cork should project about 10 millimetres above the top of the neck of the flask in order to give the required 100 millimetres immersion.

The flask is placed inside the draught-screen and pressed on the asbestos diaphragm so as to close the hole completely. It is then attached to the condenser so that the end of the side arm projects 2·5 centimetres beyond the cork.

The receiver is placed below the outlet of the condenser, so that the end of the tube extends about 2·5 centimetres below the top.

The burner is lighted and the flame so regulated that the rate of distillation is 4 to 6 millilitres per minute for liquids



Distillation Flask.

(Distillation Capacity 100 millilitres.)

boiling below 150° and 2 to 4 millilitres per minute for liquids boiling above 150°, the distance between the burner and the bottom of the flask being so adjusted that a minimum flame only is necessary.

The initial boiling-point is the temperature registered at the instant when the first drop falls from the end of the condenser. The receiver is then moved so that the end of the condenser tube touches the side, and the temperatures are noted after definite amounts have distilled, in accordance with the requirements of the specifications for the various liquids.

The barometer is read whilst the distillation is in progress and is corrected to standard conditions. If the corrected barometric pressure deviates from the normal, i.e. 760 mm. at 0° and standard gravity $\left(g = 980{\cdot}665 \frac{\text{cm.}}{\text{sec.}^2}\right)$ the observed distillation temperatures are corrected by adding or subtracting, for every 10 millimetres below or above 760 millimetres pressure, an amount '*k*' depending upon the liquid under test. The values of '*k*' are :—for Acetone, 0·38 ; for Chloroform, 0·42 ; for the other liquids for which a boiling-point standard is given in the text, 0·4.

CORRECTION OF BAROMETRIC READINGS TO STANDARD CONDITIONS

(*a*) *Index Correction.* The observed reading is corrected for index error in accordance with the certificate issued with the barometer.

(*b*) *Temperature Correction,* i.e. *reduction to 0°.* The following table gives the amounts which are subtracted from the actual readings when the temperature of the air in the vicinity of the barometer is as stated in the first column of that table.

The figures in Table I apply to mercury barometers of the Fortin or similar type in which the mercury in the cistern is set to a fiducial level when the barometric reading is taken.

For barometers of the Kew type in which the barometric reading is taken without adjusting the level of the mercury in the cistern, the temperature corrections may be taken to be 5 per cent. in excess of those given in the table.

TABLE I

CORRECTION OF BAROMETRIC READINGS TO 0°.
FORTIN BAROMETER WITH BRASS SCALE.

The correction is subtracted from the barometric reading.

Temperature of Barometer.	Barometric Reading.						
	720	730	740	750	760	770	780
	mm.	mm.	mm.	mm.	mm.	mm.	mm.
10°	1·17	1·19	1·21	1·22	1·24	1·26	1·27
11°	1·29	1·31	1·33	1·35	1·36	1·38	1·40
12°	1·41	1·43	1·45	1·47	1·49	1·51	1·53
13°	1·53	1·55	1·57	1·59	1·61	1·63	1·65
14°	1·64	1·67	1·69	1·71	1·73	1·76	1·78
15°	1·76	1·78	1·81	1·83	1·86	1·88	1·91
16°	1·88	1·90	1·93	1·96	1·98	2·01	2·03
17°	1·99	2·02	2·05	2·08	2·10	2·13	2·16
18°	2·11	2·14	2·17	2·20	2·23	2·26	2·29
19°	2·23	2·26	2·29	2·32	2·35	2·38	2·41
20°	2·34	2·38	2·41	2·44	2·47	2·51	2·54
21°	2·46	2·50	2·53	2·56	2·60	2·63	2·67
22°	2·58	2·61	2·65	2·69	2·72	2·76	2·79
23°	2·69	2·73	2·77	2·81	2·84	2·88	2·92
24°	2·81	2·85	2·89	2·93	2·97	3·01	3·05
25°	2·93	2·97	3·01	3·05	3·09	3·13	3·17
26°	3·04	3·09	3·13	3·17	3·21	3·26	3·30
27°	3·16	3·20	3·25	3·29	3·34	3·38	3·42
28°	3·28	3·32	3·37	3·41	3·46	3·51	3·55
29°	3·39	3·44	3·49	3·54	3·58	3·63	3·68
30°	3·51	3·56	3·61	3·66	3·71	3·75	3·80

(c) *Correction for gravity,* i.e. *reduction to standard gravity* (*980·665 cm./sec.^{2}*). The distillation requirements are intended to be fulfilled when the tests are carried out in latitudes not too far removed from London. When the tests are carried out in Great Britain or in places between similar parallels of latitude no correction for gravity to the barometric readings is necessary. In other cases, however, a correction may be necessary and the extent of the correction may be ascertained from the data given in the following table:—

TABLE II

CORRECTION OF BAROMETRIC READINGS TO STANDARD GRAVITY

Latitude.	Barometric Reading.			
	720	740	760	780
	mm.	mm.	mm.	mm.
0°	− 1·93	− 1·98	− 2·04	− 2·09
10°	− 1·81	− 1·86	− 1·92	− 1·97
20°	− 1·49	− 1·53	− 1·57	− 1·61
30°	− 0·98	− 1·01	− 1·04	− 1·06
40°	− 0·36	− 0·37	− 0·38	− 0·39
50°	+ 0·30	+ 0·31	+ 0·31	+ 0·32
60°	+ 0·92	+ 0·94	+ 0·97	+ 1·00
70°	+ 1·43	+ 1·47	+ 1·51	+ 1·55

C. *DETERMINATION OF REFRACTIVE INDEX*

The refractive index of a substance is determined in a suitable apparatus at the temperature specified.

D. *DETERMINATION OF OPTICAL ROTATION*

The optical rotation, unless otherwise specified, is the angle through which the plane of polarisation is turned, when a layer of the liquid substance one decimetre in thickness and at a temperature of 20° is examined by sodium light.

The specific rotation of a substance in solution may be calculated from the formula $\frac{a \times 100}{l \times c}$, where a is the observed optical rotation, l the thickness in decimetres of the layer examined, and c the number of grammes of substance contained in 100 millilitres of the solution.

E. *DETERMINATION OF SPECIFIC GRAVITY*

ANL
Se

The specific gravity of a substance, unless otherwise specified, is the weight of a given volume of that substance at 15·5° as compared with the weight of an equal volume of *water* at the same temperature, all weighings being taken in air.

F. *DETERMINATION OF VISCOSITY*

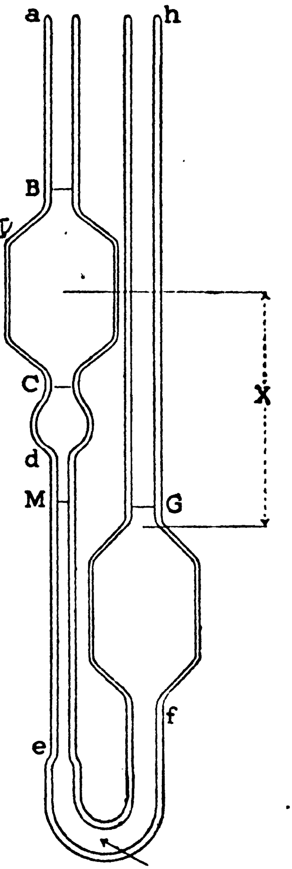
79 I + 45[illegible]

Liquid Paraffin. The viscosity of liquid paraffin is expressed empirically in terms of the rate of flow from a Redwood Viscometer.

Pyroxylin. The viscosity of a solution of pyroxylin in acetone is expressed in absolute units.

The absolute unit of viscosity on the centimetre-gramme-second system—the Poise—is the viscosity of a liquid in which the tangential force exerted on each of two parallel planes, placed 1 centimetre apart in the liquid, when one of the planes is moving in its own plane with a velocity of 1 centimetre per second, is 1 dyne per square centimetre.

The viscosity of a solution of pyroxylin is determined by means of a glass viscometer of the type shown in the figure, and constructed in accordance with the dimensions shown in the table. The specification of the apparatus and method of procedure is in agreement with the British Standard Specification No. 188, 1929.



Bend Unconstricted

B, C, M and G are etched markings and should extend round the tube.

a, *d*, *e*, *f* and *h*, are for explanatory purposes only and do not appear on the viscometer.

Range = 1·9 to 15 poises
Length of Tube (aB) = 7 cm.
Length of Capillary (de) = 10 cm.

All linear dimensions are given in centimetres.
All volumes are given in millilitres.

Capillary (de): internal diameter	0·4	0·38	0·36	0·34	0·32	0·30
Tube (aB): internal diameter	0·7	0·7	0·7	0·7	0·7	0·7
Bulb (BC): internal diameter	3·2	3·2	3·1	2·9	2·6	2·4
Bulb (BC): capacity	32·0	26·0	21·0	17·0	13·0	10·0
Bulb (Cd): capacity	1·4	1·4	1·3	1·0	0·8	0·8
Bent tube (ef): minimum internal diameter	0·8	0·8	0·8	0·8	0·8	0·8
Tube (Gh): internal diameter	0·8	0·8	0·8	0·8	0·8	0·8
Bulb (fG): minimum internal diameter	3·2	3·2	3·2	2·9	2·6	2·5
Bulb (fG): minimum capacity	33·5	27·5	22·5	18·5	14·0	11·0
Dimension x	7·1	7·1	7·0	6·8	6·5	6·3
Distance between vertical axes	2·3	2·3	2·2	2·0	1·7	1·5
Vertical distance of M above G	0·1	0·1	0·1	0·1	0·1	0·1

METHOD OF PROCEDURE.—The viscometer is filled to the marks M and G with the solution to be tested and is placed vertically in a bath maintained at a temperature of 20°. The solution is sucked, or blown, up to a point 1 centimetre above B, and the time taken for the meniscus to fall from mark B to mark C is measured.

The constant (K) of the instrument in units of the centimetre-gramme-second system is determined by observations on a liquid of known viscosity.

The viscosity is calculated from the equation

$$V = K t \rho$$

where V = viscosity in poises
t = time in seconds for the meniscus to fall from B to C
ρ = weight in grammes of 1 millilitre of the solution.

APPENDIX V

QUALITATIVE REACTIONS AND TESTS FOR SUBSTANCES MENTIONED IN THE PHARMACOPŒIA

Acetates

Acetates, when warmed with *sulphuric acid,* yield acetic acid, which has a characteristic odour; when warmed with *sulphuric acid* and a small quantity of *alcohol (95 per cent.),* they yield ethyl acetate, which has a characteristic odour.

Neutral acetates are decomposed by heat, yielding a characteristic acetous odour.

With neutral or slightly acid solutions of acetates *test-solution of ferric chloride* gives a deep red colour, and the resulting liquid on boiling yields a reddish-brown precipitate. On adding *hydrochloric acid,* the red solution turns yellow.

Aluminium

Solutions of aluminium salts yield with *dilute solution of ammonia,* or with *solution of ammonium hydrosulphide,* a white gelatinous precipitate, soluble in *hydrochloric acid,* in *acetic acid,* and in *solution of sodium hydroxide,* but nearly insoluble in *dilute solution of ammonia* and in solutions of ammonium salts, and quite insoluble in these solutions when the mixture is boiled.

Ammonium Salts

Ammonium salts volatilise, when strongly heated, leaving generally no residue. When heated with *solution of sodium hydroxide,* ammonia is evolved, recognisable by its odour.

Solutions of ammonium salts, acidified with *hydrochloric acid,* yield with *solution of platinic chloride* a yellow crystalline precipitate, especially in the presence of alcohol. This precipitate, on ignition, leaves a residue of platinum only.

Antimony

Slightly acid solutions of antimony compounds yield with *hydrogen sulphide* an orange-coloured precipitate, soluble in *solution of sodium hydroxide,* in *solution of ammonium hydrosulphide,* and in warm *hydrochloric acid* with evolution of hydrogen sulphide, but almost insoluble in *solution of ammonium carbonate.*

Solutions of antimony compounds treated with nascent hydrogen, generated by the interaction of *zinc* and *dilute sulphuric acid*, yield hydrogen antimonide. A cold porcelain tile held in the flame of this gas acquires a dark metallic deposit, which is not appreciably dissolved by *solution of chlorinated soda*.

Solutions of antimony compounds treated with nascent hydrogen, generated by the interaction of *zinc* and *solution of sodium hydroxide*, do not yield hydrogen antimonide.

If one end of a strip or rod of *zinc* rests on the side of a platinum capsule, containing an acidified solution of an antimony compound, the other end being in the solution, antimony is precipitated on the platinum as a black, adherent, non-granular stain, insoluble in *hydrochloric acid*.

Bright *copper foil* precipitates antimony from solutions of its compounds. The antimony may be volatilised by drying the copper foil and heating it in a test tube, and condenses as a white amorphous sublimate of oxides of antimony on the sides of the test-tube near to the copper.

Arsenic

Solutions of arsenic compounds, containing *hydrochloric acid*, yield with *hydrogen sulphide* a yellow precipitate, soluble in *solution of sodium hydroxide*, in *solution of ammonium hydrosulphide*, and in *solution of ammonium carbonate*, but reprecipitated on addition of *hydrochloric acid*.

Solutions of arsenic compounds treated with nascent hydrogen, generated by the interaction of *zinc* and *dilute sulphuric acid*, yield hydrogen arsenide. A cold porcelain tile held in the flame of this gas acquires a dark metallic deposit, which is readily dissolved by *solution of chlorinated soda*.

Solutions of arsenic compounds treated with nascent hydrogen, generated by the interaction of *zinc* and *solution of sodium hydroxide*, slowly yield hydrogen arsenide; this gas gives a black stain to filter-paper, moistened with *solution of silver nitrate* and placed as a cap over the mouth of the tube in which the test is being performed.

Bright *copper foil* precipitates arsenic from solutions of its compounds, acidified by *hydrochloric acid*. The arsenic may be volatilised by drying the copper foil and heating it in a test-tube, and condenses as a white sublimate of characteristic octahedral crystals of arsenic trioxide at some distance from the copper.

Arsenites. Solutions of arsenites yield a yellow precipitate with *solution of silver ammonio-nitrate.*

Arsenates. Solutions of arsenates yield a reddish-chocolate precipitate with *solution of silver ammonio-nitrate.* With *solution of magnesium ammonio-sulphate* they produce a white crystalline precipitate.

Bismuth

Solutions of bismuth salts give the following reactions :—

Hydrogen sulphide produces a brownish-black precipitate, insoluble in *solution of sodium hydroxide*, in *dilute hydrochloric acid*, and in *solution of ammonium hydrosulphide*, but soluble in warm *nitric acid.*

Solution of sodium hydroxide, or *dilute solution of ammonia*, except in the presence of some organic acids, produces a white precipitate, insoluble in excess of the precipitant.

A dilute solution of *sodium chloride* in large excess produces in solutions, which are not too acid, a white precipitate, insoluble in *solution of tartaric acid.*

Bromides

When a bromide is heated with *sulphuric acid* and *manganese dioxide*, or *potassium dichromate*, bromine is liberated ; the vapour gives an orange-yellow colour to filter-paper, moistened with *mucilage of starch.*

Solutions of bromides give with *solution of silver nitrate* a yellowish curdy precipitate, somewhat soluble in strong but almost insoluble in very dilute solutions of ammonia, and insoluble in *nitric acid.*

From solutions of bromides bromine is liberated by *solution of chlorine.* The bromine is soluble in two or three drops of *carbon disulphide*, or *chloroform*, forming a reddish solution.

In testing for bromides in the presence of iodides, all iodine must first be removed by boiling the aqueous solution with excess of *lead dioxide.*

Calcium

Solutions of calcium salts give the following reactions :—

Solution of ammonium carbonate produces a white precipitate which, after the mixture is boiled and allowed to cool, is insoluble in *solution of ammonium chloride.*

Solution of ammonium oxalate produces a white precipitate, soluble in *hydrochloric acid*, but insoluble in *acetic acid.*

Solution of potassium chromate produces no precipitate.

Carbonates and Bicarbonates

Carbonates and bicarbonates effervesce with dilute acids, liberating carbon dioxide ; the gas is odourless, and produces a white precipitate in *solution of calcium hydroxide.*

Solutions of carbonates produce a brownish-red precipitate with *test-solution of mercuric chloride* ; solutions of bicarbonates produce a white precipitate.

Solutions of carbonates produce, at room temperature, a white precipitate with *solution of magnesium sulphate* ; solutions of bicarbonates do not.

Chlorides

Chlorides, heated with *manganese dioxide* and *sulphuric acid,* yield chlorine, recognisable by its odour, and by giving a blue colour with *solution of potassium iodide and starch.*

Solutions of chlorides produce with *solution of silver nitrate* a white curdy precipitate, soluble in *dilute solution of ammonia,* but insoluble in *nitric acid.*

Citrates

Citrates become charred, when heated.

Solutions of citrates give the following reactions :—

Solution of calcium chloride, added in excess to a neutral solution of a citrate produces, when the mixture is boiled, a white granular precipitate, soluble in *acetic acid.*

Solution of silver nitrate, added in excess to a neutral solution of a citrate, produces a white precipitate, soluble in *nitric acid* and in *dilute solution of ammonia.* A mirror is not formed on the sides of the test-tube, when this ammoniacal solution is warmed.

Copper

Solutions of copper salts give the following reactions :—

Hydrogen sulphide produces a brownish-black precipitate, insoluble in *dilute hydrochloric acid* and in *solution of sodium hydroxide,* almost insoluble in *solution of ammonium hydrosulphide,* but decomposed and dissolved by boiling *nitric acid.*

Solution of sodium hydroxide produces a light-blue precipitate, which becomes brownish-black on boiling.

Dilute solution of ammonia produces a greenish-blue precipitate, which readily dissolves in excess of the precipitant, forming a deep-blue solution.

Cupric salts in solution produce with *solution of potassium ferrocyanide* a reddish-brown precipitate, or, in very dilute solution, a reddish-brown colour.

Cyanides

Solutions of cyanides produce with *solution of silver nitrate* a white curdy precipitate, soluble in *solution of potassium cyanide*, in *dilute solution of ammonia*, and slowly in boiling *nitric acid*.

When to a solution of a cyanide are added a few drops of a solution of ferrous and ferric salts, and a few drops of *solution of sodium hydroxide*, and the mixture is boiled, the addition of an excess of *hydrochloric acid* produces a blue precipitate.

Iodides

Iodides, heated with *sulphuric acid* and *manganese dioxide* or *potassium dichromate*, evolve violet vapours of iodine.

Solutions of iodides produce with *solution of silver nitrate* a yellow curdy precipitate, insoluble in *nitric acid*, and almost insoluble in *dilute solution of ammonia*.

Solutions of iodides produce with *test-solution of mercuric chloride* a scarlet precipitate, slightly soluble in excess of this reagent, and very soluble in excess of *solution of potassium iodide*.

From solutions of iodides a small quantity of *solution of chlorine* liberates iodine, which colours *carbon disulphide* violet, and *mucilage of starch* deep blue.

Iron

Reaction common to solutions of Ferrous and Ferric salts :—

Solution of ammonium hydrosulphide produces, in neutral solutions, a black precipitate, soluble in cold *dilute hydrochloric acid* with evolution of hydrogen sulphide.

Reactions characteristic of solutions of Ferrous salts :—

Solution of potassium ferrocyanide produces a white precipitate, rapidly turning blue, and insoluble in *dilute hydrochloric acid*.

Solution of potassium ferricyanide produces a dark-blue precipitate, insoluble in *dilute hydrochloric acid*, and decomposed by *solution of sodium hydroxide*.

Solution of sodium hydroxide produces a dull-green precipitate.

Reactions characteristic of solutions of Ferric salts :—

Solution of ammonium thiocyanate produces a blood-red colour, which is discharged on the addition of *test-solution of mercuric chloride.*

Solution of potassium ferricyanide produces a reddish-brown colour, but no precipitate.

Solution of sodium hydroxide produces, in the absence of citrates and tartrates, a reddish-brown precipitate, soluble in a solution of *citric acid*, or of *tartaric acid.*

Lead

Solutions of lead salts give the following reactions :—

Hydrochloric acid, added to solutions which are sufficiently strong, produces a white precipitate, soluble in boiling *water*, and redeposited as crystals when the solution is cooled.

Hydrogen sulphide, added to solutions which are not very strongly acid, produces a black precipitate, insoluble in *dilute hydrochloric acid*, and in *solution of ammonium hydrosulphide*, but soluble in hot *dilute nitric acid.*

Dilute sulphuric acid produces a white precipitate, almost insoluble in *water*, more insoluble in *dilute sulphuric acid* and in *alcohol (90 per cent.)*, but soluble in *dilute solution of ammonium acetate.*

Solution of potassium chromate produces a yellow precipitate, readily soluble in *solution of sodium hydroxide* and in hot *nitric acid*, sparingly soluble in *dilute nitric acid*, and insoluble in *acetic acid.*

Lignin

Lignified cell walls are coloured bright red by soaking them in *solution of phloroglucinol* and adding a drop or two of *hydrochloric acid.*

Solution of aniline hydrochloride colours lignified tissues yellow.

Magnesium

Solutions of magnesium salts give the following reactions :—

Solution of ammonium carbonate, in the presence of *solution of ammonium chloride*, produces no precipitate.

Solution of sodium phosphate, in the presence of ammonium salts and *dilute solution of ammonia*, produces a white crystalline precipitate.

Solution of sodium hydroxide produces a white precipitate, insoluble in excess of the reagent, but soluble in *solution of ammonium chloride.*

Mercury

Reactions common to solutions of Mercurous and Mercuric salts :—

Hydrogen sulphide produces a black precipitate, insoluble in *solution of ammonium hydrosulphide* and in boiling *dilute nitric acid.*

Bright *copper foil,* immersed in a solution free from excess of nitric acid, becomes coated with a deposit of mercury, which on rubbing becomes bright ; the mercury may be volatilised from the foil by heat and obtained in globules.

Reaction characteristic of solutions of Mercurous salts :—

Hydrochloric acid produces a white precipitate, insoluble in *water,* and blackened by *dilute solution of ammonia.*

Reactions characteristic of solutions of Mercuric salts :—

Solution of sodium hydroxide produces a yellow precipitate.

Solution of potassium iodide, added to a neutral solution, produces a scarlet precipitate, soluble in excess of the precipitant, and in a considerable excess of the solution of the mercuric salt.

Nitrates

Nitrates liberate red fumes, when warmed with *sulphuric acid* and *copper.*

When a solution of a nitrate is mixed with an equal volume of *sulphuric acid,* the mixture cooled, and *solution of ferrous sulphate* superimposed, a brown colour is produced at the junction of the two liquids.

Nitrites

Nitrites, when heated with *dilute sulphuric acid,* evolve red fumes.

On adding to a solution of a nitrite a few drops of *dilute sulphuric acid* and of *solution of potassium iodide,* and *mucilage of starch,* a blue colour is produced.

Solutions of nitrites produce with *solution of ferrous sulphate* a deep brown colour.

Phosphates

Solutions of ortho-phosphates give the following reactions :—

Solution of silver ammonio-nitrate produces a light yellow precipitate, readily soluble in *dilute solution of ammonia,* and in cold *dilute nitric acid.*

Solution of magnesium ammonio-sulphate produces a white crystalline precipitate.

Solution of ammonium molybdate, containing much *nitric acid*, produces, on warming, a yellow precipitate.

Potassium

Potassium compounds, moistened with *hydrochloric acid* and introduced on platinum wire into the flame of a Bunsen burner, give a violet colour to the flame.

Moderately strong solutions of potassium chloride, or of other potassium salts if hydrochloric acid be present, give with *solution of platinic chloride* a yellow crystalline precipitate, which, on ignition, leaves a residue of potassium chloride and platinum.

Silver

Solutions of silver salts give the following reactions:—

Solutions of chlorides or *hydrochloric acid* produce a white curdy precipitate, soluble in *dilute solution of ammonia*, and insoluble in *nitric acid.*

Solution of potassium chromate produces a red precipitate, soluble in *nitric acid.*

Sodium

Sodium compounds, moistened with *hydrochloric acid* and introduced on a platinum wire into the flame of a Bunsen burner, give a yellow colour to the flame.

Sulphates

Solutions of sulphates give with *solution of barium chloride* a white precipitate, insoluble in *hydrochloric acid.*

Sulphites

Sulphites, heated with *hydrochloric acid*, evolve sulphur dioxide, a colourless gas with a pungent smell of burning sulphur.

Solutions of sulphites give with *solution of barium chloride* a white precipitate, soluble in *hydrochloric acid.*

Solutions of sulphites decolourise *solution of iodine.*

Tartrates

Tartrates become charred, when heated.

Solutions of tartrates give the following reactions:—

Solution of calcium chloride, added in excess to a neutral solution of a tartrate, produces, even when cold, a white granular precipitate, soluble in *acetic acid*.

Solution of silver nitrate, added in excess to a neutral solution of a tartrate, produces a white precipitate, soluble in *nitric acid* and in *dilute solution of ammonia*; this ammoniacal solution, on heating, deposits metallic silver as a mirror on the sides of the test-tube.

On adding to a solution of tartaric acid in *water*, or of a tartrate acidified with *acetic acid*, a drop of *solution of ferrous sulphate*, a few drops of *solution of hydrogen peroxide*, and an excess of *solution of sodium hydroxide*, a purple or violet colour is produced.

Zinc

Solutions of zinc salts give the following reactions:—

Solution of ammonium hydrosulphide produces in neutral solutions, and *hydrogen sulphide* in alkaline solutions, a white precipitate, soluble in *hydrochloric acid*, but insoluble in *acetic acid*.

Solution of potassium ferrocyanide produces a white precipitate, insoluble in *dilute hydrochloric acid*.

APPENDIX VI

QUANTITATIVE TEST FOR LEAD

APPARATUS

All glass apparatus used must be free from soluble lead.

Nessler Glasses

Cylinders of thin white glass, about 25 millimetres in diameter and about 150 millimetres in length, graduated at 50 millilitres. The depth, measured internally, from the graduation mark to the bottom, must not vary by more than 2 millimetres in the glasses used for a test.

REAGENTS AND SOLUTIONS

The special reagents and solutions are distinguished by the letters Pb T.

Acetic Acid Pb T. *Acetic acid* which complies with the following additional test:—Make 25 millilitres alkaline with *solution of ammonia Pb T.*, add 1 millilitre of *solution of potassium cyanide Pb T.*, dilute to 50 millilitres with *water*, and add two drops of *solution of sodium sulphide Pb T.*; no darkening is produced.

Citric Acid Pb T. *Citric acid* which complies with the following additional test:—Dissolve 10 grammes in 25 millilitres of *water*, make alkaline with *solution of ammonia Pb T.*, add 1 millilitre of *solution of potassium cyanide Pb T.*, dilute to 50 millilitres with *water*, and add two drops of *solution of sodium sulphide Pb T.*; no darkening is produced.

Dilute Hydrochloric Acid Pb T. *Dilute hydrochloric acid* which complies with the following additional test:—Make 10 millilitres alkaline with *solution of ammonia Pb T.*, add 1 millilitre of *solution of potassium cyanide Pb T.*, dilute to 50 millilitres with *water*, and add two drops of *solution of sodium sulphide Pb T.*; no darkening is produced.

Solution of Ammonia Pb T. *Dilute solution of ammonia* which complies with the following additional test:—To 20 millilitres add 1 millilitre of *solution of potassium cyanide Pb T.*, dilute to 50 millilitres with *water*, and add two drops of *solution of sodium sulphide Pb T.*; no darkening is produced.

Solution of Ammonium Citrate Pb T. Dissolve 400 grammes of *citric acid Pb T.* in *water*, add gradually about 340 millilitres of *strong solution of ammonia*, until alkaline to *litmus*, and dilute to 1000 millilitres with *water*. The resulting solution complies with the following test:—To 25 millilitres add 1 millilitre of *solution of potassium cyanide Pb T.*, dilute to 50 millilitres with *water* and add two drops of *solution of sodium sulphide Pb T.*; no darkening is produced.

Solution of Diphenylthiocarbazone Pb T. A 0·1 per cent. w/v solution of *diphenylthiocarbazone* in *chloroform*.

Solution of Diphenylthiocarbazone Pb T. must be freshly prepared.

Solution of Potassium Cyanide Pb T. Dissolve 10 grammes of *potassium cyanide* in 90 millilitres of *water*, add 2 millilitres of *solution of hydrogen peroxide*, allow to stand for twenty-four hours, and make up to 100 millilitres with *water*. The resulting solution complies with the following test:—Mix 2 millilitres with 5 millilitres of *solution of ammonia Pb T.* and 40 millilitres of *water*, and add 5 millilitres of *dilute solution of lead Pb T.*; no darkening is produced.

Solution of Sodium Hydroxide Pb T. Dissolve 20 grammes of *sodium hydroxide* in sufficient *water* to produce 100 millilitres. The solution complies with the *limit test for lead*, 25 millilitres being used in the primary solution, and 5 millilitres together with 0·5 millilitre of *dilute solution of lead Pb T.* in the auxiliary solution, and the addition of *acetic acid Pb T.* and *solution of ammonia Pb T.* being omitted.

Solution of Sodium Sulphide Pb T. Dissolve 10 grammes of *sodium sulphide* in sufficient *water* to produce 100 millilitres, and filter.

Strong Solution of Lead Pb T. Dissolve 0·16 gramme of *lead nitrate* in 50 millilitres of *nitric acid* and sufficient *water* to produce 100 millilitres. This solution contains 1 milligram of lead in 1 millilitre.

Dilute Solution of Lead Pb T. Dilute 1 millilitre of *strong solution of lead Pb T.* with sufficient *water* to produce 100 millilitres. This solution contains 0·01 milligram of lead in 1 millilitre. It should be freshly prepared.

GENERAL METHOD OF TESTING

In accordance with the table appended, two solutions of the substance under examination, the primary solution and the auxiliary solution, are made in hot *water*, containing the required quantity of *acetic acid Pb T.*; carbon dioxide, if any is generated, is removed by boiling.

The volume of *dilute solution of lead Pb T.*, prescribed in the table, is added to the auxiliary solution. Each solution is made alkaline with *solution of ammonia Pb T.*, and 1 millilitre of *solution of potassium cyanide Pb T.* is added. If the solutions are now turbid, they are filtered. If the colours of the solutions differ, they are equalised by the addition of a few drops of a highly diluted solution of burnt sugar or other non-reactive substance. The two solutions are diluted to 50 millilitres, and two drops of solution of *sodium sulphide Pb T.* are added to each and thoroughly mixed. The colours are compared by a suitable method, such as by light reflected from a white tile through the Nessler glasses. If the colour in the primary solution is greater than that in the auxiliary solution, the substance contains more lead than the permitted limit.

The proportion of lead in the substance may be determined by observing the quantity of *dilute solution of lead Pb T.* which must be added to the auxiliary solution, in order that, after dilution to 50 millilitres, there may be equal colours produced on the addition of 2 drops of *solution of sodium sulphide Pb T.* in both primary and auxiliary solutions. If more than 15 millilitres of *dilute solution of lead Pb T.* is required, a smaller quantity of the substance must be taken.

TABLE OF QUANTITIES USED IN THE TEST.

In the following table are given the quantities of the various substances used in the primary and auxiliary solutions, together with the quantities of *acetic acid Pb T.* required, and the volumes of *dilute solution of lead Pb T.* corresponding to the permissible lead limits :—

Substance.	Primary Solution.		Auxiliary Solution.		Millilitres of Dilute Solution of Lead Pb T employed.	Limit of Lead. Parts per million.
	Grammes of Substance employed.	Millilitres of Acetic Acid Pb T.	Grammes of Substance employed.	Millilitres of Acetic Acid Pb T.		
Acidum Aceticum	12	—	2	—	1	**1**
Acidum Aceticum Dilutum	30	—	10	—	1	**0·5**
Acidum Aceticum Glaciale	7	—	2	—	1·5	**3**
Acidum Acetylsalicylicum	7 [a]	5	2 [a]	5	5	**10**
Acidum Benzoicum	7 [a]	5	2 [a]	5	2·5	**5**
Acidum Boricum	4 [a]	5	2 [a]	5	5	**25**
Acidum Citricum	7	—	2	—	10	**20**
Acidum Hydrobromicum Dilutum	12	—	2	—	5	**5**
Acidum Hydrochloricum	7	—	2	—	5	**10**
Acidum Hypophosphorosum Dilutum	7	5	2	5	2·5	**5**
Acidum Lacticum	7	—	2	—	5	**10**
Acidum Nitricum	7	—	2	—	10	**20**

[a] Solution effected by the addition of *solution of ammonia Pb T.*

Substance.	Primary Solution.		Auxiliary Solution.		Millilitres of Dilute Solution of Lead Pb T. employed.	Limit of Lead. Parts per million.
	Grammes of Substance employed.	Millilitres of Acetic Acid Pb T.	Grammes of Substance employed.	Millilitres of Acetic Acid Pb T.		
Acidum Phosphoricum	4	5	2	—	2	10
Acidum Salicylicum	7[a]	5	2[a]	5	2·5	5
Acidum Sulphuricum	4	—	2	—	4	20
Acidum Tartaricum	7	—	2	—	10	20
Ammonii Bicarbonas	7	25	2	10	2·5	5
Ammonii Carbonas	7	25	2	10	2·5	5
Ammonii Chloridum	12	5	2	5	5	5
Antimonii et Potassii Tartras	2[b]	—	1[b]	—	0·5	5
Antimonii et Sodii Tartras	2[b]	—	1[b]	—	0·5	5
Borax	7[a]	12	2[a]	7	2·5	5
Calcii Carbonas	4	20	2	12	2	10
Calcii Chloridum	7	5	2	5	10	20
Calcii Hydroxidum	3	20	1	10	4	20
Calcii Lactas	7	5	2	5	5	10

Calcii Phosphas	1[c]	—	—	—	2	**20**
Creta	4	20	2	12	4	**20**
Dextrosum	12	5	2	5	2	**2**
Glucosum Liquidum	12	5	2	5	2	**2**
Glycerinum	12	5	2	5	1	**1**
Hexamina	7	5	2	5	1	**2**
Indicarminum	2·5[d]	—	—	—	5	**20**
Kaolinum	7[e]	5	2[e]	5	2·5	**5**

[a] Solution effected by the addition of *solution of ammonia Pb T.*

[b] Test carried out by adding to each solution 7 millilitres of *solution of sodium hydroxide Pb T.*, 1 milillitre of *solution of potassium cyanide Pb T.* and 2 drops of *solution of sodium sulphide Pb T.*

[c] Primary solution, prepared by dissolving 1 gramme in 10 millilitres of *dilute hydrochloric acid Pb T.*, and adding 25 millilitres of *solution of ammonium citrate Pb T.* Auxiliary solution, 25 millilitres of *solution of ammonium citrate Pb T.*

[d] Primary solution prepared as follows:—Heat 2·5grammes with 5 millilitres of *water* and 5 millilitres of *nitric acid Pb T.* in a round-bottomed flask until the first reaction has subsided, cool, add 2·5 millilitres of *sulphuric acid Pb T.* and heat until the mixture begins to darken, then add drop by drop, while still heating, 3 millilitres, or a sufficient quantity, of *nitric acid Pb T.* and continue the heating until white fumes are given off and the liquid is almost colourless. Cool, dilute with 5 millilitres of *water* and evaporate until white fumes are again given off. Cool, dilute with 100 millilitres of *water* and dissolve 2 grammes of *citric acid Pb T.* in the liquid, then make alkaline with *solution of ammonia Pb T.* and add 1 millilitre of *solution of potassium cyanide Pb T.* Transfer to a separator, add 10 millilitres of *solution of diphenylthiocarbazone Pb T.* and shake vigorously. Allow the liquids to separate and run off the lower layer. Repeat the extraction with two further quantities of 5 millilitres of *solution of diphenylthiocarbazone Pb T.* Wash each solution with the same 10 millilitres of *water* contained in a second separator Evaporate the mixed solutions to dryness; add 0·5 millilitre of *sulphuric acid Pb T.* to the residue and heat until white fumes are given off, then add, drop by drop, 0·5 millilitre of *nitric acid Pb T.*, and continue the heating until white fumes are again given off and the liquid is almost colourless. Cool, dilute with 35 millilitres of *water*, add 5 millilitres of *acetic acid Pb T.*, 10 millilitres of *solution of ammonia Pb T.* and 1 millilitre of *solution of potassium cyanide Pb T.*

Auxiliary solution prepared by mixing 5 millilitres of *acetic acid Pb T.* with 30 millilitres of *water*, 10 millilitres of *solution of ammonia Pb T.* and 1 millilitre of *solution of potassium cyanide Pb T.*

[e] Solution prepared by boiling the kaolin with the *acetic acid Pb T.* diluted with 25 millilitres of *water* and filtering.

Substance.	Primary Solution.		Auxiliary Solution.		Millilitres of Dilute Solution of Lead Pb T. employed.	Limit of Lead. Parts per million.
	Grammes of Substance employed.	Millilitres of Acetic Acid Pb T.	Grammes of Substance employed.	Millilitres of Acetic Acid Pb T.		
Lactosum	7	5	2	5	1	**2**
Lævulosum	7	5	2	5	1	**2**
Liquor Ammoniæ Dilutus	36	—	6	—	1	**0·3**
Liquor Ammoniæ Fortis	12	—	2	—	1	**1**
Liquor Ammonii Acetatis Dilutus	36	—	6	—	2	**0·6**
Liquor Ammonii Acetatis Fortis	12	—	2	—	5	**5**
Liquor Calcii Hydroxidi	200 [f] millilitres	—	100 [f] millilitres	—	5	**0·5**
Liquor Magnesii Bicarbonatis	200 [g] millilitres	—	100 [g] millilitres	—	5	**0·5**
Magnesii Carbonas Levis	4	20	2	12	4	**20**
Magnesii Carbonas Ponderosus	4	20	2	12	4	**20**
Magnesii Oxidum Leve	3	30	1	12	4	**20**
Magnesii Oxidum Ponderosum	3	30	1	12	4	**20**
Magnesii Sulphas	12	5	2	5	5	**5**

Mistura Magnesii Hydroxidi . .	20	15	10	12	2	**2**
Potassii Acetas	12	5	2	5	10	**10**
Potassii Bicarbonas	7	20	2	10	2·5	**5**
Potassii Bromidum	12	5	2	5	10	**10**
Potassii Carbonas	7	20	2	10	2·5	**5**
Potassii Chloras	2	5	1	5	1	**10**
Potassii Citras	12	5	2	5	10	**10**
Potassii Hydroxidum	7	25	2	7	2·5	**5**
Potassii Iodidum	12	5	2	5	10	**10**
Potassii Nitras	7	5	2	5	5	**10**
Potassii Tartras Acidus . . .	7 [a]	5	2 [a]	5	10	**20**
Saccharinum Solubile . . .	3 [a]	8	1 [a]	6	2	**10**
Sodii Benzoas	7 [a]	15	2 [a]	7	5	**10**
Sodii Bicarbonas	7	20	2	10	2·5	**5**
Sodii Bromidum	12	5	2	5	10	**10**
Sodii Carbonas	7	15	2	7	5	**10**

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[a] Solution effected by the addition of *solution of ammonia Pb T.*

[f] Solutions prepared by treating 300 millilitres with 15 millilitres of *acetic acid Pb T.* and concentrating to 60 millilitres, 40 millilitres being used in the primary solution, and 20 millilitres in the auxiliary solution.

[g] Solutions prepared by treating 300 millilitres with 30 millilitres of *acetic acid Pb T.* and concentrating to 60 millilitres, 40 millilitres being used in the primary solution, and 20 millilitres in the auxiliary solution.

Substance.	Primary Solution.		Auxiliary Solution.		Millilitres of Dilute Solution of Lead Pb T. employed.	Limit of Lead. Parts per million.
	Grammes of Substance employed.	Millilitres of Acetic Acid Pb T.	Grammes of Substance employed.	Millilitres of Acetic Acid Pb T.		
Sodii Carbonas Exsiccatus . .	3	15	1	10	5	**25**
Sodii Chloridum	7	5	2	5	2·5	**5**
Sodii Citras	12	5	2	5	10	**10**
Sodii et Potassii Tartras . .	7 [a]	10	2 [a]	7	10	**20**
Sodii Hydroxidum	4	20	2	12	1	**5**
Sodii Iodidum	12	5	2	5	10	**10**
Sodii Nitris	7	5	2	5	10	**20**
Sodii Phosphas	7	5	2	5	2·5	**5**
Sodii Phosphas Acidus . . .	7	—	2	—	2·5	**5**
Sodii Salicylas	7 [a]	12	2 [a]	7	5	**10**
Sodii Sulphas	12	5	2	5	5	**5**
Sucrosum	7	5	2	5	1	**2**
Theobromina et Sodii Salicylas .	4	10	2	7	2	**10**

[a] Solution effected by the addition of *solution of ammonia Pb T.*

APPENDIX VII

QUANTITATIVE TEST FOR ARSENIC

Note.—In the quantitative test for arsenic, the amount of arsenic present is expressed as arsenic trioxide, As_2O_3.

APPARATUS.

A wide-mouthed bottle, capable of holding about 120 millilitres, is fitted with a rubber bung through which passes a glass tube. The latter, made from ordinary glass tubing, has a total length of 200 millimetres and an internal diameter of exactly 6·5 millimetres (external diameter about 8 millimetres), and is drawn out at one end to a diameter of about 1 millimetre, and a hole not less than 2 millimetres in diameter is blown in the side of the tube, near the constricted part. The tube is passed through the bung fitting the bottle so that, when inserted in the bottle containing 70 millilitres of liquid, the constricted end of the tube is above the surface of the liquid and the hole in the side is below the bottom of the bung. The upper end of the tube is cut off square, and is either (1) slightly rounded off or (2) ground smooth.

Two rubber bungs (about 25 × 25 millimetres), each with a hole bored centrally and true, and exactly 6·5 millimetres in diameter, are fitted with a rubber band or spring clip for holding them tightly together. Alternatively the two bungs may be replaced by any suitable contrivance, satisfying the conditions described under the general test.

Lead Papers are pieces of thin white filter paper, 100 × 50 millimetres, soaked in *solution of lead acetate*, and dried.

Mercuric Chloride Papers are pieces of smooth white filter paper, not less than 25 millimetres in width, soaked in a saturated aqueous solution of *mercuric chloride*, pressed to remove superfluous moisture, and dried at about 60° in the dark. The grade of the filter paper shall be such that the weight in grammes per square metre shall be between 65 and 120; the thickness in millimetres of 400 papers shall be approximately equal, numerically, to the weight in grammes per square metre.

Note.—The mercuric chloride papers should be stored in a stoppered bottle in the dark. Papers, which have been exposed to sunlight or to the vapour of ammonia, afford a lighter coloured stain or no stain at all, when employed in the arsenic test.

REAGENTS AND SOLUTIONS

The special reagents and solutions are distinguished by the letters 'As T'.

Brominated Hydrochloric Acid As T.

Solution of Bromine As T. . .	1 millilitre
Hydrochloric Acid As T. . .	100 millilitres

Mix.

Calcium Hydroxide As T. *Calcium hydroxide* which complies with the following additional test :—Dissolve 5 grammes in 25 millilitres of *brominated hydrochloric acid As T.* and 35 millilitres of *water,* remove the excess of bromine by a few drops of *solution of stannous chloride As T.*, and apply the *general test* ; no visible stain is produced.

Citric Acid As T. *Citric acid* which complies with the following additional test :—Dissolve 10 grammes in 50 millilitres of *water,* add 10 millilitres of *stannated hydrochloric acid As T.*, and apply the *general test* ; no visible stain is produced.

Hydrochloric Acid As T. *Hydrochloric acid* which contains not more than 0·05 part per million of arsenic, as shown by the *control test,* and complies with the following additional test :—Dilute 10 millilitres with sufficient *water* to produce 50 millilitres, add 5 millilitres of *solution of ammonium thiocyanate,* and stir immediately ; no colour is produced.

Nitric Acid As T. *Nitric acid* which complies with the following additional test :—Heat 20 millilitres in a porcelain dish with 2 millilitres of *sulphuric acid As T.*, until white fumes are given off. Cool, add 2 millilitres of *water,* and again heat, until white fumes are given off ; cool, add 50 millilitres of *water* and 10 millilitres of *stannated hydrochloric acid As T.*, and apply the *general test* ; no visible stain is produced.

Potassium Chlorate As T. *Potassium chlorate* which complies with the following additional test :—Mix 5 grammes in the cold with 20 millilitres of *water* and 22 millilitres of *hydrochloric acid As T.*; when the first reaction has subsided, heat gently to expel chlorine, remove the last traces by a few drops of *solution of stannous chloride As T.*, add 20 millilitres of *water*, and apply the *general test*; no visible stain is produced.

Solution of Bromine As T.

Bromine	30 grammes
Potassium Bromide . . .	30 grammes
Water, sufficient to produce . .	100 millilitres

Dissolve and mix. It contains not more than 1 part per million of arsenic, as shown by the *control test.*

Solution of Stannous Chloride As T. is prepared from *solution of stannous chloride* by adding an equal volume of *hydrochloric acid*, boiling down to the original volume, and filtering through a fine-grained filter-paper. It contains not more than 1 part per million of arsenic, as shown by the *control test.*

Stannated Hydrochloric Acid As T.

Solution of Stannous Chloride As T.	1 millilitre
Hydrochloric Acid As T. . .	100 millilitres

Mix.

Strong Solution of Arsenic As T.

Arsenic Trioxide	0·1 gramme
Hydrochloric Acid . . .	50·0 millilitres
Water, sufficient to produce .	100·0 millilitres

Dissolve.

Dilute Solution of Arsenic As T.

Strong Solution of Arsenic As T .	1 millilitre
Water, sufficient to produce . .	100 millilitres

Mix.

Dilute Solution of Arsenic must be freshly prepared. 1 millilitre contains 0·00001 gramme (one-hundredth of one milligram) of arsenic.

Sulphuric Acid As T. *Sulphuric acid* which complies with the following additional test:—Dilute 10 grammes with 50 millilitres of *water*, add 0·2 millilitre of *solution of stannous chloride As T.*, and apply the *general test*; no visible stain is produced.

Zinc As T. *Granulated zinc* which conforms *to* the *control tests*, and is free from iron.

CONTROL TESTS FOR REAGENTS As T. AND SOLUTIONS As T.

Hydrochloric Acid As T. To 50 millilitres add 0·2 millilitre of *solution of bromine As T.*, evaporate on a water-bath until reduced to 16 millilitres, adding more *solution of bromine As T.*, if necessary, in order that an excess, as indicated by the colour, may be present throughout the evaporation; add 50 millilitres of *water* and 5 drops of *solution of stannous chloride As T.* and apply the *general test*; the stain produced is not deeper than a 0·2 millilitre *standard stain* prepared with the same acid, showing that the proportion of arsenic present does not exceed 0·05 part per million.

Solution of Bromine As T. Evaporate 10 millilitres on a water-bath nearly to dryness, add 50 millilitres of *water*, 10 millilitres of *hydrochloric acid As T.* and sufficient solution of *stannous chloride As T.* to reduce the remaining bromine, and apply the *general test*; the stain produced is not deeper than a 1 millilitre *standard stain*, showing that the proportion of arsenic present does not exceed 1 part per million.

Solution of Stannous Chloride As T. To 10 millilitres add 6 millilitres of *water* and 10 millilitres of *hydrochloric acid As T.*, and distil 16 millilitres. To the distillate add 50 millilitres of *water* and 2 drops of *solution of stannous chloride As T.*, and apply the *general test*; the stain produced is not deeper than a 1 millilitre *standard stain*, showing that the proportion of arsenic present does not exceed 1 part per million.

Zinc As T. Add 10 millilitres of *stannated hydrochloric acid As T.* to 50 millilitres of *water*, and apply the *general test*, using 10 grammes of the zinc, but allow the action to continue for one hour; no visible stain is produced (limit of arsenic). Repeat the test with the addition of 0·1 millilitre of *dilute solution of arsenic As T.*; a faint but distinct yellow stain is produced (test for sensitivity).

GENERAL METHOD OF TESTING

By a variable method of procedure, suitable to the particular needs of each case, there is prepared from the substance to be tested a solution, which may or may not contain that substance, but in every case contains the whole of the arsenic (if any) originally present in that substance. This solution, referred to as 'the solution to be examined', is used in the actual test.

General Test. A strip of the lead paper is rolled up to form a cylinder 100 millimetres in length, and is placed in the glass tube so that the upper end is not less than 25 millimetres below the top of the tube. The upper end of the tube is then inserted into the narrow end of one of the pair of rubber bungs, either (1) to a depth of about 10 millimetres in the case of the tube with the rounded-off end, or (2) so that the ground end of the tube is flush with the larger end of the bung. A piece of *mercuric chloride paper* is placed flat on the top of the bung, and the other bung placed over it and secured by means of the rubber band or spring clip, in such a manner that the borings of the two bungs (or the upper bung and the glass tube) meet to form a true tube of 6·5 millimetres diameter interrupted by a diaphragm of *mercuric chloride paper*.

Instead of this method of attaching the mercuric chloride paper, any other method may be used provided, (1) that the whole of the evolved gas passes through the paper; (2) that the portion of the paper in contact with the gas is a circle of 6·5 millimetres diameter; and (3) that the paper is protected from sunlight during the test.

The solution to be examined, prepared as specified, is placed in the wide-mouthed bottle, 10 grammes of *zinc As T.* is added, and the prepared glass tube is placed quickly in position. The action is allowed to proceed for forty minutes. The yellow stain which is produced on the mercuric chloride paper, if arsenic is present, is compared by daylight with the *standard stains*, produced by operating in a similar manner with known quantities of *dilute solution of arsenic As T.* The comparison of the stains is made immediately at the completion of the test, and those used for comparison are freshly prepared; the stains fade on keeping.

By matching the depth of colour with *standard stains*, the proportion of arsenic in the substance may be determined. A stain equivalent to the 1 millilitre *standard stain*, produced by operating on 10 grammes of a substance, indicates that the proportion of arsenic is 1 part per million.

Notes. 1. The action may be accelerated by placing the apparatus on a warm surface, care being taken that the *mercuric chloride paper* remains quite dry throughout the test.

2. The most suitable temperature for carrying out the test is generally about 40°, but, as the rate of evolution of the gas varies somewhat with different batches of *zinc As T.*, the temperature may be adjusted to obtain a regular, but not too violent, evolution of gas.

3. The tube must be washed with *hydrochloric acid As T.*, rinsed with *water*, and dried between successive tests.

Standard Stains. Solutions are prepared by adding to 50 millilitres of *water*, 10 millilitres of *stannated hydrochloric acid As T.* and quantities of *dilute solution of arsenic As T.* varying from 0·2 millilitre to 1 millilitre. The resulting solutions, when treated as described in the *general test*, yield stains on the *mercuric chloride papers*, referred to as the *standard stains*.

METHODS OF PREPARING THE SOLUTION TO BE EXAMINED

The various methods of preparing the solution to be examined are given in the following pages. The quantities are so arranged that the test may be used as a limit test, in which case the stain, produced from the solution to be examined, is not deeper than the 1 millilitre *standard stain*, showing that the proportion of arsenic present does not exceed the permitted limit:—

Acidum Aceticum. Limit 2 parts per million.

Mix 5 grammes with 50 millilitres of *water* and 10 millilitres of *stannated hydrochloric acid As T.*

Acidum Aceticum Glaciale. Limit 6 parts per million.

Treat 1·6 grammes as described under 'Acidum Aceticum'.

Acidum Acetylsalicylicum. Limit **2** parts per million.

Mix **5** grammes with 2 grammes of *calcium hydroxide As T.* and 5 millilitres of *water* in a porcelain dish; dry, and ignite gently; dissolve the residue in 16 millilitres of *brominated hydrochloric acid As T.* and 45 millilitres of *water*, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Acidum Benzoicum. Limit **2** parts per million.

Treat **5** grammes as described under 'Acidum Acetylsalicylicum'.

Acidum Boricum. Limit **5** parts per million.

Dissolve **2** grammes with 4 grammes of *citric acid As T.* in 50 millilitres of *water*, and add 10 millilitres of *stannated hydrochloric acid As T.*

Acidum Citricum. Limit **1** part per million.

Dissolve **10** grammes in 50 millilitres of *water*, and add 10 millilitres of *stannated hydrochloric acid As T.*

Acidum Hydrobromicum Dilutum.
Limit **5** parts per million.

Treat **2** grammes as described under 'Acidum Aceticum'.

Acidum Hydrochloricum. Limit **5** parts per million.

Treat **2** grammes as described under 'Acidum Aceticum'.

Acidum Hypophosphorosum Dilutum.
Limit **2** parts per million.

Mix **5** grammes with 1 gramme of *potassium chlorate As T.*, 10 millilitres of *water* and 15 millilitres of *hydrochloric acid As T.*, and allow to stand for one hour. Heat gently to expel chlorine, remove the last traces of it by a few drops of *solution of stannous chloride As T.*, and add 35 millilitres of *water*.

Acidum Lacticum. Limit **5** parts per million.

Treat **2** grammes as described under 'Acidum Aceticum'.

Acidum Nitricum. Limit **5** parts per million.

Heat **2** grammes in a porcelain dish with 2 millilitres of *sulphuric acid As T.*, until white fumes are given off. Cool, add 2 millilitres of *water*, and again heat, until white fumes are given off; cool, and add 50 millilitres of *water* and 10 millilitres of *stannated hydrochloric acid As T.*

Acidum Phosphoricum. Limit **5** parts per million.

Treat **2** grammes as described under 'Acidum Aceticum'.

Cupri Sulphas. Limit **10** parts per million.

Dissolve **1** gramme in 10 millilitres of *water* in a small flask, add 15 millilitres of *stannated hydrochloric acid As T.*, connect to a condenser, and distil 20 millilitres; to the distillate add a few drops of *solution of bromine As T.* in order to oxidise any sulphurous acid; remove the excess of bromine by a few drops of *solution of stannous chloride As T.*, and add 40 millilitres of *water.*

Dextrosum. Limit **1** part per million.

Treat **10** grammes as described under 'Acidum Citricum'.

Extractum Malti. Limit **1·4** parts per million.

Treat **7** grammes as described under 'Glucosum Liquidum'.

Ferri Carbonas Saccharatus. Limit **5** parts per million.

Mix **2** grammes with 1 gramme of *calcium hydroxide As T.* and 2 millilitres of *water* in a porcelain dish, dry, and ignite gently; dissolve the residue in 20 millilitres of *brominated hydrochloric As T.* and 10 millilitres of *water*; transfer to a small flask, and add sufficient *solution of stannous chloride As T.* to remove the yellow colour, connect to a condenser, and distil 22 millilitres; to the distillate add 40 millilitres of *water* and 3 drops of *solution of stannous chloride As T.*

Ferri et Ammonii Citras. Limit **5** parts per million.

Treat **2** grammes as described under 'Ferri Carbonas Saccharatus'.

Ferri et Quininæ Citras. Limit **5** parts per million.

Treat **2** grammes as described under 'Ferri Carbonas Saccharatus'.

Ferri Sulphas. Limit **2** parts per million.

Dissolve **5** grammes in 10 millilitres of *water* and 15 millilitres of *stannated hydrochloric acid As T.*, and distil 20 millilitres; to the distillate add a few drops of *solution of bromine As T.* in order to oxidise any sulphurous acid; remove the excess of bromine by a few drops of *solution of stannous chloride As T.*, and add 40 millilitres of *water.*

Ferri Sulphas Exsiccatus. Limit **4** parts per million.

Treat **2·5** grammes as described under 'Ferri Sulphas'.

Ferrum. Limit **200** parts per million.

Mix **0·5** gramme with 1 gramme of *potassium chlorate As T.* and 10 millilitres of *water*; add 15 millilitres of *hydrochloric acid As T.*, and, when the reaction has ceased and all the iron is dissolved, boil gently to expel most of the chlorine; transfer to a small flask, and add *solution of stannous chloride As T.*, until the yellow colour disappears; connect to a condenser, and distil 16 millilitres; dilute the distillate to 50 millilitres with *water*; to 5 millilitres of the diluted distillate add 10 millilitres of *stannated hydrochloric acid As T.* and 45 millilitres of *water.*

Ferrum Redactum. Limit **200** parts per million.

Treat **0·5** gramme as described under 'Ferrum'.

Glucosum Liquidum. Limit **2** parts per million.

Dissolve **5** grammes in 50 millilitres of *water*, and add 10 millilitres of *brominated hydrochloric acid As T.*; allow to stand for five minutes, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Glycerinum. Limit **4** parts per million.

Treat **2·5** grammes as described under 'Acidum Aceticum'.

Hexamina. Limit **2** parts per million.

Treat **5** grammes as described under 'Acidum Acetylsalicylicum'.

Indicarminum. Limit **10** parts per million.

Treat **1** gramme as described under 'Methylthioninæ Chloridum'.

Kaolinum. Limit **2** parts per million.

Treat **5** grammes as described under 'Barii Sulphas'.

Lactosum. Limit **1** part per million.

Treat **10** grammes as described under 'Acidum Citricum'.

Lævulosum. Limit **2** parts per million.

Treat **5** grammes as described under 'Acidum Citricum'.

Liquor Ammoniæ Dilutus. Limit **0·16** part per million.

Treat **60** millilitres as described under 'Liquor Ammoniæ Fortis'.

Liquor Ammoniæ Fortis. Limit **0·5** part per million.

Evaporate **20** millilitres on a water-bath, until reduced to 5 millilitres; add 40 millilitres of *water* and 15 millilitres of *brominated hydrochloric acid As T.*, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Liquor Ammonii Acetatis Dilutus. Limit **0·5** part per million.

Mix **20** grammes with 30 millilitres of *water*, and add 12 millilitres of *stannated hydrochloric acid As T.*

Liquor Ammonii Acetatis Fortis. Limit **4** parts per million.

Treat **2·5** grammes as described under 'Calcii Lactas'.

Liquor Calcii Hydroxidi. Limit **0·2** part per million.

To **50** millilitres add 10 millilitres of *stannated hydrochloric acid As T.*

Liquor Ferri Perchloridi. Limit **2·5** parts per million.

Heat **4** grammes in a porcelain dish with 1 millilitre of *sulphuric acid As T.*, until white fumes are given off; cool, add an equal volume of *water*, and again heat, until white fumes are given off; cool, and dissolve the residue in 10 millilitres of *water* and 15 millilitres of *hydrochloric acid As T.*; transfer to a small flask, add *solution of stannous chloride As T.*, until the yellow colour disappears, connect to a condenser, and distil 20 millilitres; to the distillate add a few drops of *solution of bromine As T.* in order to oxidise any sulphurous acid, remove the excess of bromine by a few drops of *solution of stannous chloride As T.*, and add 40 millilitres of *water.*

Liquor Magnesii Bicarbonatis. Limit **0·2** part per million.

To **50** millilitres add 13 millilitres of *brominated hydrochloric acid As T.*, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Magnesii Carbonas Levis. Limit **5** parts per million.

Dissolve **2** grammes in 45 millilitres of *water* and 15 millilitres of *brominated hydrochloric acid As T.*, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Magnesii Carbonas Ponderosus. Limit **5** parts per million.

Treat **2** grammes as described under 'Magnesii Carbonas Levis'

Magnesii Oxidum Leve. Limit **5** parts per million.

Dissolve **2** grammes in 40 millilitres of *water* and 20 millilitres of *brominated hydrochloric acid As T.*, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Magnesii Oxidum Ponderosum. Limit **5** parts per million.

Treat **2** grammes as described under 'Magnesii Oxidum Leve'.

Magnesii Sulphas. Limit **2** parts per million.

Treat **5** grammes as described under 'Acidum Citricum'.

Methylthioninæ Chloridum. Limit **10** parts per million.

Heat **1** gramme with 7 millilitres of *water* and 3 millilitres of *nitric acid As T.* in a round-bottomed, long-necked flask, until the first reaction has subsided; cool, add 5 millilitres of *sulphuric acid As T.*, and heat the mixture, until it begins to darken; add, drop by drop, while still heating, 3 millilitres, or a sufficient quantity, of *nitric acid As T.*; continue the heating, until white fumes are given off and the liquid is colourless. Cool, dilute with 20 millilitres of *water*, and evaporate, until white fumes are again given off. Cool, dilute with *water* to 15 millilitres, add 10 millilitres of *stannated hydrochloric acid As T.* and 3 drops of *solution of stannous chloride As T.*, and distil 18 millilitres; to the distillate add a few drops of *solution of bromine As T.*, remove the excess of bromine by a few drops of *solution of stannous chloride As T.*, and add 40 millilitres of *water*.

Mistura Magnesii Hydroxidi. Limit 1 part per million.

Mix 10 grammes with 40 millilitres of *water* and 11 millilitres of *brominated hydrochloric acid As T.*, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Phenolphthaleinum. Limit 2 parts per million.

Treat 5 grammes as described under 'Methylthioninæ Chloridum'.

Potassii Acetas. Limit 2 parts per million.

Dissolve 5 grammes in 50 millilitres of *water*, and add 15 millilitres of *stannated hydrochloric acid As T.*

Potassii Bicarbonas. Limit 2 parts per million.

Dissolve 5 grammes in 50 millilitres of *water*, add 15 millilitres of *brominated hydrochloric acid As T.*, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Potassii Bromidum. Limit 2 parts per million.

Treat 5 grammes as described under 'Calcii Lactas'.

Potassii Carbonas. Limit 2 parts per million.

Dissolve 5 grammes in 50 millilitres of *water*, add 16 millilitres of *brominated hydrochloric acid As T.*, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Potassii Chloras. Limit 2 parts per million.

Mix 5 grammes in the cold with 20 millilitres of *water* and 22 millilitres of *hydrochloric acid As T.*; when the first reaction has subsided, heat gently to expel chlorine, remove the last traces by a few drops of *solution of stannous chloride As T.*, and add 20 millilitres of *water*.

Potassii Citras. Limit 2 parts per million.

Treat 5 grammes as described under 'Potassii Acetas'.

Potassii Hydroxidum. Limit 5 parts per million.

Dissolve 2 grammes in 50 millilitres of *water*, add 14 millilitres of *brominated hydrochloric acid As T.*, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Potassii Iodidum. Limit 2 parts per million.

Treat 5 grammes as described under 'Calcii Lactas'.

Potassii Nitras. Limit 2 parts per million.

Heat 5 grammes in a porcelain dish with 5 millilitres of *sulphuric acid As T.* and 5 millilitres of *water*, until white fumes are given off; cool, add 5 millilitres of *water*, and again heat, until white fumes are given off; cool, and add 50 millilitres of *water* and 5 millilitres of *stannated hydrochloric acid As T.*

Potassii Tartras Acidus. Limit 2 parts per million.

Dissolve 5 grammes in 50 millilitres of *water* and 13 millilitres of *brominated hydrochloric acid As T.*, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Sodii Benzoas. Limit 2 parts per million.

Heat 5 grammes gently in a porcelain dish, until carbonised; dissolve the residue, ignoring any carbon, in 50 millilitres of *water* and 14 millilitres of *brominated hydrochloric acid As T.*, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Sodii Bicarbonas. Limit 2 parts per million.

Treat 5 grammes as described under 'Potassii Bicarbonas'.

Sodii Bromidum. Limit 2 parts per million.

Treat 5 grammes as described under 'Calcii Lactas'.

Sodii Carbonas. Limit 2 parts per million.

Treat 5 grammes as described under 'Potassii Carbonas'.

Sodii Carbonas Exsiccatus. Limit 5 parts per million.

Treat 2 grammes as described under 'Potassii Carbonas'.

Sodii Chloridum. Limit 1 part per million.

Treat 10 grammes as described under 'Acidum Citricum'.

Sodii Citras. Limit 2 parts per million.

Treat 5 grammes as described under 'Potassii Acetas'.

Sodii et Potassii Tartras. Limit 2 parts per million.

Treat 5 grammes as described under 'Potassii Acetas'.

Sodii Hydroxidum. Limit 5 parts per million.

Dissolve 2 grammes in 50 millilitres of *water*, add 15 millilitres of *brominated hydrochloric acid As T.*, and remove the excess of bromine by a few drops of *solution of stannous chloride As T.*

Sodii Iodidum. Limit 2 parts per million.

Treat 5 grammes as described under 'Calcii Lactas'.

Sodii Nitris. Limit **5** parts per million.

Treat **2** grammes with 2 millilitres of *sulphuric acid As T.* as described under 'Potassii Nitras'.

Sodii Phosphas. Limit **5** parts per million.

Treat **2** grammes as described under 'Acidum Citricum'.

Sodii Phosphas Acidus. Limit **5** parts per million.

Treat **2** grammes as described under 'Acidum Citricum'.

Sodii Salicylas. Limit **2** parts per million.

Treat **5** grammes as described under 'Sodii Benzoas'.

Sodii Sulphas. Limit **2** parts per million.

Treat **5** grammes as described under 'Acidum Citricum'.

Sucrosum. Limit **1** part per million.

Treat **10** grammes as described under 'Acidum Citricum'.

Sulphur Præcipitatum. Limit **5** parts per million.

Digest **2** grammes for one hour on a water-bath with 50 millilitres of *water* and 5 millilitres of *dilute solution of ammonia*, filter, and evaporate the filtrate to dryness; boil the residue with 1 gramme of *calcium hydroxide As T.* and 10 millilitres of *water*, and add, drop by drop, while boiling, *solution of bromine As T.*, until the mixture is yellow; add 5 millilitres of *hydrochloric acid As T.*, boil gently to expel the bulk of the bromine, and remove the excess by a few drops of *solution of stannous chloride As T.*; finally add 50 millilitres of *water* and 8 millilitres of *stannated hydrochloric acid As T.*

Sulphur Sublimatum. Limit **5** parts per million.

Treat **2** grammes as described under 'Sulphur Præcipitatum'.

Theobromina et Sodii Salicylas. Limit **2** parts per million.

Treat **5** grammes as described under 'Sodii Benzoas'.

Theophyllina et Sodii Acetas. Limit **2** parts per million.

Treat **5** grammes as described under 'Sodii Benzoas'.

Zinci Oxidum. Limit **10** parts per million.

Treat **1** gramme as described under 'Calcii Carbonas'.

Zinci Sulphas. Limit **5** parts per million.

Treat **2** grammes as described under 'Acidum Citricum'.

APPENDIX VIII

A. *LIMIT TEST FOR CHLORIDES*

Dissolve the specified weight of the substance in *water*, or prepare a solution as directed in the text, and transfer to a Nessler cylinder. Add 1 millilitre of *nitric acid*, except when *nitric acid* is used in the preparation of the solution; dilute to 50 millilitres with *water*, and add 1 millilitre of *solution of silver nitrate*. Stir immediately with a glass rod, and set aside for five minutes. The opalescence produced is not greater than the *standard opalescence*.

Standard Opalescence. Measure 1 millilitre of *N/100 hydrochloric acid* and 1 millilitre of *nitric acid* into a Nessler cylinder. Dilute to 50 millilitres with *water*, and add 1 millilitre of *solution of silver nitrate*. Stir immediately with a glass rod, and set aside for five minutes.

B. *LIMIT TEST FOR SULPHATES*

Dissolve the specified weight of the substance in *water*, or prepare a solution as directed in the text, and transfer to a Nessler cylinder. Add 1 millilitre of *hydrochloric acid*, except when *hydrochloric acid* is used in the preparation of the solution; dilute to 50 millilitres with *water*, and add 1 millilitre of *solution of barium chloride*. Stir immediately with a glass rod, and set aside for five minutes. The turbidity produced is not greater than the *standard turbidity*.

Standard Turbidity. Measure 2·5 millilitres of *N/100 sulphuric acid* and 1 millilitre of *hydrochloric acid* into a Nessler cylinder. Dilute to 50 millilitres with *water*, and add 1 millilitre of *solution of barium chloride*. Stir immediately with a glass rod, and set aside for five minutes.

C. *LIMIT TEST FOR IRON*

Boil the specified weight of the substance with 5 millilitres of *dilute nitric acid Fe T.*, or prepare a solution as directed in the text, cool, dilute to 50 millilitres with *water*, add 5 millilitres of *solution of ammonium thiocyanate*, and stir immediately.

Compare the colour in a Nessler cylinder with the *standard colour*, both solutions being used within five minutes of preparation. The colour is not deeper than the *standard colour.*

Standard Colour. Boil 2 millilitres of *standard solution of iron Fe T.* with 5 millilitres of *dilute nitric acid Fe T.*, cool, dilute to 50 millilitres with *water*, add 5 millilitres of *solution of ammonium thiocyanate*, and stir immediately.

Standard Solution of Iron Fe T. Dissolve 0·173 gramme of *ferric ammonium sulphate* in sufficient *water* to produce 1000 millilitres. 1 millilitre contains 0·00002 gramme (one-fiftieth of one milligram) of iron.

Dilute Nitric Acid Fe T. *Dilute nitric acid* which complies with the following additional test :—dilute 5 millilitres with sufficient *water* to produce 50 millilitres, add 5 millilitres of *solution of ammonium thiocyanate*, and stir immediately; no colour is produced.

APPENDIX IX

A. *TEST FOR THE ABSENCE OF COTTON-SEED OIL IN OTHER OILS*

Mix in a stout glass tube, having a capacity of not less than 15 millilitres, 2·5 millilitres of the oil with 2·5 millilitres of a mixture of equal volumes of *amyl alcohol* and *carbon disulphide*, the latter containing 1 per cent. w/v of *precipitated sulphur* in solution. Close the tube securely, and immerse it to one-third of its depth in boiling water ; no reddish colour develops in half an hour.

B. *TEST FOR THE ABSENCE OF SESAME OIL IN OTHER OILS*

Shake 2 millilitres of the oil with 1 millilitre of *hydrochloric acid*, containing 1 per cent. w/v of *sucrose*, and set aside for five minutes ; the acid layer is not coloured pink, or, if a pink colour appears, it is not deeper than that obtained by repeating the test without the *sucrose*.

C. *TEST FOR THE ABSENCE OF ARACHIS OIL IN OTHER OILS*

Boil 1 millilitre of the oil in a small flask under a reflux condenser for five minutes with 5 millilitres of *1·5 N alcoholic potassium hydroxide*, add 1·5 millilitres of *acetic acid* and 50 millilitres of *alcohol* (*70 per cent.*); warm, until the solution is clear, then, with a thermometer in the liquid, cool slowly to 15·5°; if, after keeping the liquid at this temperature for five minutes, it remains clear, arachis oil is absent. If a precipitate is formed, carry out the following test:—

Boil 5 grammes of the oil in a 200 millilitre conical flask with 25 millilitres of *1·5 N alcoholic potassium hydroxide* for five minutes under a reflux condenser. To the hot solution add 7·5 millilitres of *acetic acid* and 100 millilitres of *alcohol* (*70 per cent.*), containing 1 millilitre of *hydrochloric acid*. Maintain the temperature for an hour at 12° to 14°. Filter, and wash with the same mixture of *alcohol* (*70 per cent.*) and *hydrochloric acid* at 17° to 19°, the precipitate being broken up occasionally by means of a platinum wire bent into a loop. The washing is continued, until the washings give no turbidity with *water*. Dissolve the precipitate according to its bulk in 25 to 70 millilitres of hot *alcohol* (*90 per cent.*), cool, and allow it to stand at 15° for one to three hours. If any crystals appear, filter, and wash at 15° with about half the volume of *alcohol* (*90 per cent.*), used for crystallisation, and finally with 50 millilitres of *alcohol* (*70 per cent.*). Dissolve the crystals in warm *ether*, remove the ether, and dry at 100°. The *melting-point* is lower than 71°. Recrystallise from a small quantity of *alcohol* (*90 per cent.*); the melting-point, after drying at 100°, remains lower than 71°.

If no crystals appear after the alcoholic solution of fatty acids has been kept for three hours at 15°, or, if the quantity of crystals is very small, add a sufficient quantity of *water* to reduce the strength of the alcohol to 70 per cent. (31 millilitres of *water* to 100 millilitres of *alcohol* (*90 per cent.*)). Set aside for an hour at a temperature of 17° to 19°. If no crystals form, arachis oil is absent. If crystals form, filter, wash with *alcohol* (*70 per cent.*), dissolve in warm *ether*, evaporate, and dry at 100°. The *melting-point* of the crystals, both before and after a recrystallisation from *alcohol* (*90 per cent.*), as described above, is lower than 71°.

APPENDIX X

A. *DETERMINATION OF THE ACID VALUE OF FIXED OILS, FATS, AND RESINS*

The acid value of a fixed oil, fat, or resin is the number of milligrams of potassium hydroxide required to neutralise the free acid in 1 gramme of the substance, when determined by the following method :—

Weigh accurately about 10 grammes of the substance (1 to 5 grammes in the case of a resin) into a 250 millilitre flask, and add 50 millilitres of *alcohol* (*90 per cent.*), which has been freshly boiled and neutralised after the addition of 5 millilitres of *solution of phenolphthalein.* Boil, until the substance has completely melted ; titrate with *N/10 aqueous potassium hydroxide,* shaking constantly. Note the number of millilitres required (a). Calculate the acid value from the following formula :—

$$\text{Acid Value} = \frac{a \times 0{\cdot}00561 \times 1000}{\text{Weight (in grammes) of substance}}.$$

B. *DETERMINATION OF THE SAPONIFICATION VALUE OF FIXED OILS, AND FATS*

The saponification value of an oil, or fat, is the number of milligrams of potassium hydroxide required to neutralise the fatty acids, resulting from the complete hydrolysis of 1 gramme of the oil, or fat, when determined by the following method :—

Dissolve from 35 to 40 grammes of *potassium hydroxide* in 20 millilitres of *water*, and add sufficient *alcohol* (*95 per cent.*) to make 1000 millilitres. Allow it to stand overnight, and pour off the clear liquid.

Weigh accurately about 2 grammes of the substance in a flask, having a capacity of about 200 millilitres ; add 25 millilitres of the alcoholic solution of *potassium hydroxide*, attach a reflux condenser, and heat on a water-bath for thirty minutes, frequently rotating the contents ; add 5 millilitres of *solution of phenolphthalein*, and titrate the excess of alkali with *N/2 hydrochloric acid.* Note the number of millilitres required (a). Repeat the operation without the substance being tested.

Note the number of millilitres required (b). Calculate the saponification value from the following formula:—

$$\text{Saponification value} = \frac{(b - a) \times 0.02805 \times 1000}{\text{Weight (in grammes) of substance}}$$

C. *DETERMINATION OF THE IODINE VALUE OF FIXED OILS, AND FATS*

The iodine value of a fixed oil, or fat, is the weight of iodine absorbed by 100 parts by weight of the oil, or fat, when determined by the following method:—

Place the oil, or fat, accurately weighed, in a dry stoppered vessel, add 10 millilitres of *carbon tetrachloride*, and dissolve. Add 20 millilitres of *solution of iodine monochloride*, insert the stopper, previously moistened with *solution of potassium iodide*, and keep in a dark place at a temperature of about 17° for half an hour. Add 15 millilitres of *solution of potassium iodide* and 100 millilitres of *water*; shake, and titrate with *N/10 sodium thiosulphate*, using *mucilage of starch* as indicator. Note the number of millilitres required (a). At the same time carry out the operation in exactly the same manner, but without the substance being tested, and note the number of millilitres of *N/10 sodium thiosulphate* required (b).

Calculate the iodine value from the following formula:—

$$\text{Iodine Value} = \frac{(b - a) \times 0{\cdot}01269 \times 100}{\text{Weight (in grammes) of substance}}.$$

The approximate weight, in grammes, of substance to be taken may be calculated by dividing 20 by the highest expected iodine value. If more than half the available halogen is absorbed, the test must be repeated on a smaller quantity of the substance being tested.

REAGENT

Solution of Iodine Monochloride.—The solution may be prepared by either of the two following methods:—

(1) Dissolve 13 grammes of *iodine* in 1000 millilitres of *glacial acetic acid*. To 20 millilitres of this solution add 15 millilitres of *solution of potassium iodide* and 100 millilitres of *water*, and titrate the solution with *N/10 sodium thiosulphate*. Pass *chlorine*, washed and dried, through the remainder of the

iodine solution, until the amount of *N/10 sodium thiosulphate*, required for the titration, is approximately, but not more than, doubled.

(2)	*Iodine Trichloride* . . .	8 grammes
	Iodine	9 grammes
	Glacial Acetic Acid, sufficient to produce	1000 millilitres

Dissolve the *iodine trichloride* in about 200 millilitres of *glacial acetic acid*; dissolve the *iodine* in about 500 millilitres of *glacial acetic acid*; mix the two solutions, and add sufficient *glacial acetic acid* to produce the required volume.

Solution of iodine monochloride should be kept in a stoppered bottle, protected from light, and stored in a cool place.

D. *DETERMINATION OF THE UNSAPONIFIABLE MATTER IN FIXED OILS, AND FATS*

Boil on a water-bath for one hour 2·5 grammes of the oil, or fat, with 25 millilitres of *N/2 alcoholic potassium hydroxide* in a flask provided with a reflux condenser. Transfer the contents of the flask to a separator with 50 millilitres of *water*, and extract with three successive quantities of 50 millilitres of *ether*. Mix the ethereal solutions in a separator, containing about 20 millilitres of *water*. Gently rotate the separator without violent shaking, and, after separation, run off the water, and wash the ethereal solution by shaking vigorously with two successive quantities of 20 millilitres of *water*. Shake the ethereal solution thoroughly with two successive quantities of 20 millilitres of *N/2 aqueous potassium hydroxide*, followed, after separation, by two successive quantities of 20 millilitres of *water*. Separate the ethereal layer, remove the ether, add 5 millilitres of *acetone*, remove the acetone, dry the residue at 80°, and weigh. Dissolve the residue in 10 millilitres of *alcohol* (*90 per cent.*), previously boiled, cooled, and neutralised to *phenolphthalein*, and titrate with *N/10 sodium hydroxide*, using *solution of phenolphthalein* as indicator. Each millilitre of *N/10 sodium hydroxide* is equivalent to 0·02823 gramme of free acids, calculated as oleic acid. Subtract the weight of free acids, calculated as oleic acid, from the weight of residue, and multiply the remainder by 40, in order to obtain the percentage of unsaponifiable matter.

APPENDIX XI

A. *DETERMINATION OF THE ESTERS IN VOLATILE OILS*

Weigh accurately about 2 grammes of the oil into a hard glass flask, add 2 millilitres of *water*, and neutralise the free acid with *N/10 aqueous potassium hydroxide*, using 1 millilitre of 1 per cent. w/v solution of *phenolphthalein* in *alcohol* (*60 per cent.*) as indicator. Add 40 millilitres of *N/2 alcoholic potassium hydroxide*, attach the flask to a reflux condenser, and boil on a water-bath for one hour; cool rapidly, add 20 millilitres of *water*, and titrate the excess of alkali with *N/2 sulphuric acid*.

Repeat the operation without the oil.

The difference between the titrations is equivalent to the alkali required to saponify the esters.

Each millilitre of *N/2 alcoholic potassium hydroxide* is equivalent to :—

0·09808 gramme	of Bornyl Acetate
0·09808 gramme	of Linalyl Acetate
0·09909 gramme	of Menthyl Acetate
0·07603 gramme	of Methyl Salicylate

The Ester Value of a volatile oil is calculated from the following formula :—

$$\text{Ester Value} = \frac{m \times 28{\cdot}05}{w}$$

where m = volume, in millilitres, of *N/2 potassium hydroxide* required to saponify the esters

and w = weight, in grammes, of oil taken.

B. *DETERMINATION OF FREE ALCOHOLS IN VOLATILE OILS*

1. Carry out the method described for the determination of esters in volatile oils, and calculate the ester value of the oil.

2. Determine the ester value of the acetylated oil by the following method :—

Mix 10 millilitres of the oil, 20 millilitres of *acetic anhydride*, and 2 grammes of freshly fused *anhydrous sodium acetate* in a long-necked, round-bottomed 200 millilitre flask, attached to an air-cooled reflux condenser. Support the flask on a sheet of asbestos in which a hole about 4 centimetres in diameter has been cut, and heat it with a small naked flame, not more than 25 millimetres in height, which does not impinge on the bottom of the flask. Boil gently for two hours, allow the flask to cool, add 50 millilitres of *water*, and heat on a boiling water-bath for fifteen minutes, with frequent and thorough shaking. Cool, and transfer the contents of the flask to a separator, and reject the lower layer. Wash the acetylated oil successively with (1) 50 millilitres of *brine*; (2) 50 millilitres of *brine*, containing in solution 1 gramme of *anhydrous sodium carbonate*; (3) 50 millilitres of *brine*. At each washing shake vigorously, and allow separation to take place completely before rejecting the lower layer. Finally, shake gently with 20 millilitres of *water*, and remove the watery layer as completely as possible. Pour the acetylated oil into a small dish, and add 3 grammes of powdered *anhydrous sodium sulphate*; stir frequently during fifteen minutes, or until a drop of the oil produces no cloudiness, when added to 10 drops of *carbon disulphide* in a dry tube. Filter the oil through a dry filter paper in a covered funnel.

Treat about 2 grammes of the acetylated oil, accurately weighed, according to the method for the *determination of esters in volatile oils*, and calculate the ester value of the acetylated oil from the formula given.

3. The percentage of free alcohols is then obtained from the following formula:—

$$\text{Percentage of free alcohols} = \frac{(b - a)y}{0{\cdot}42 \times (1336 - b)}$$

where a = ester value of the oil,
b = ester value of the acetylated oil,
and y = molecular weight of the alcohol.

Value of y: Borneol, 154·1; Menthol, 156·2; Santalol, and other alcohols of the formula $C_{15}H_{24}O$, 220·2.

C. *DETERMINATION OF ALDEHYDES IN VOLATILE OILS*

(1) Oil of Lemon.

Weigh accurately about 10 grammes of the oil into a stoppered tube, approximately 25 millimetres in diameter and 150 millimetres in length; add 7 millilitres of ***hydroxylamine hydrochloride reagent in alcohol (60 per cent.)*** and 1 drop of ***solution of methyl orange***; shake, and neutralise the liberated acid with *N/2 potassium hydroxide in alcohol* (*60 per cent.*), until the red colour changes to yellow; continue the shaking and neutralising, until the full yellow colour of the indicator is permanent in the lower layer, after shaking vigorously for two minutes and allowing separation to take place. The reaction is complete in about fifteen minutes. Each millilitre of *N/2 potassium hydroxide* is equivalent to 0·07667 (0·07606 × 1·008) gramme of citral. This procedure gives an approximate determination of the citral in the oil. Carry out a second determination in exactly the same manner, using, as the colour standard for the end-point, the titrated liquid of the first determination with the addition of 0·5 millilitre of *N/2 potassium hydroxide in alcohol* (*60 per cent.*). Calculate the accurate value from this second determination.

Note.—The volume of the *hydroxylamine hydrochloride reagent in alcohol* (*60 per cent.*) used is varied according to the citral content of the oil, and must exceed by 1 to 2 millilitres the volume of *N/2 potassium hydroxide in alcohol* (*60 per cent.*) required.

(2) Oil of Cinnamon.

Carry out the process described for Oil of Lemon, using about 1 gramme, accurately weighed, of the Oil of Cinnamon, with 5 millilitres of *benzene*, and from 10 to 12 millilitres of *hydroxylamine hydrochloride reagent in alcohol* (*60 per cent.*), according to the aldehyde content of the oil. The volume of *hydroxylamine hydrochloride reagent in alcohol* (*60 per cent.*) used must exceed by 1 to 2 millilitres the volume of *N/2 potassium hydroxide in alcohol* (*60 per cent.*) required. Each millilitre of *N/2 potassium hydroxide in alcohol* (*60 per cent.*) is equivalent to 0·06656 (0·06603 × 1·008) gramme of cinnamic aldehyde.

REAGENTS

N/2 Potassium Hydroxide in alcohol (60 per cent.).

A solution containing in 1000 millilitres 28·05 grammes of KOH, prepared with *alcohol* (*60 per cent.*), and standardised by means of *N/2 hydrochloric acid* by running the alkali into the acid, until the full yellow colour of the indicator, *solution of methyl orange*, is obtained.

Hydroxylamine Hydrochloride Reagent in alcohol (60 per cent.).

Dissolve 35 grammes of *hydroxylamine hydrochloride* in 950 millilitres of *alcohol* (*60 per cent.*); add 3 millilitres of *solution of methyl orange* and *N/2 potassium hydroxide in alcohol (60 per cent.)*, until the full yellow colour of the indicator is obtained; add sufficient *alcohol (60 per cent.)* to produce 1000 millilitres.

Industrial Methylated Spirit must not be used in making these solutions.

D. *DETERMINATION OF CARVONE IN OIL OF CARAWAY, AND IN OIL OF DILL*

Weigh accurately about 1·5 grammes of the oil into a stoppered tube, approximately 25 millimetres in diameter and 150 millimetres in length; add 10 millilitres of *hydroxylamine hydrochloride reagent in alcohol (90 per cent.)*, and place the tube in a water-bath at 75° to 80°. Neutralise the liberated acid with *N/1 potassium hydroxide in alcohol (90 per cent.)*, until the red colour changes to yellow; continue the heating in the water-bath and the neutralising, until the full yellow colour of the indicator is permanent after further heating for five minutes. The reaction is complete in about thirty-five minutes. Each millilitre of *N/1 potassium hydroxide* is equivalent to 0·1513 (0·1501 × 1·008) gramme of carvone. This procedure gives an approximate determination of the carvone in the oil. At the same time carry out a second determination in exactly the same manner, using as the colour standard for the end-point, the titrated liquid of the first determination with the addition of 0·5 millilitre of *N/1 potassium hydroxide in alcohol (90 per cent.)*. Calculate the accurate value from this second determination.

REAGENT

Hydroxylamine Hydrochloride Reagent in alcohol (90 per cent.).

Dissolve 70 grammes of *hydroxylamine hydrochloride* in 900 millilitres of *alcohol (90 per cent.)*; add 4 millilitres of *solution of dimethyl yellow* and *N/1 potassium hydroxide in alcohol (90 per cent.)*, until the full yellow colour of the indicator is obtained; add sufficient *alcohol (90 per cent.)* to produce 1000 millilitres.

Industrial Methylated Spirit must not be used in making this solution, nor in making the *N/1 potassium hydroxide in alcohol (90 per cent.)*, used in this determination.

E. *DETERMINATION OF CINEOLE IN OIL OF CAJUPUT, IN OIL OF EUCALYPTUS, AND IN EUCALYPTOL*

Into a stout-walled test-tube, about 15 millimetres in diameter and 80 millimetres in length, place 3 grammes, accurately weighed, of the oil, or of Eucalyptol, previously dried by shaking with *calcium chloride*, together with 2·1 grammes of melted *o-cresol*. Insert a thermometer, graduated in fifths of a degree, and stir the mixture well in order to induce crystallisation; note the highest reading of the thermometer. Warm the tube gently, until the contents are completely melted; insert the tube through a bored cork into a wide-mouthed bottle which is to act as an air jacket; allow to cool slowly, until crystallisation commences, or until the temperature has fallen to the point previously noted. Stir the contents of the tube vigorously with the thermometer, rubbing the latter on the side of the tube with an up and down motion in order to induce rapid crystallisation; continue the stirring and rubbing as long as the temperature rises. Take the highest point as the freezing-point.

Remelt the mixture, and repeat the determination of the freezing-point until two consecutive concordant results are obtained, because the first temperature noted is always lower than the true freezing-point.

Find the percentage w/w of cineole corresponding to the freezing-point from the following table, obtaining intermediate values by interpolation:—

TABLE OF FREEZING-POINTS CORRESPONDING TO PERCENTAGES OF CINEOLE

Freezing-point.	Per cent. w/w of Cineole.	Freezing-point.	Per cent. w/w of Cineole.
24°	45·6	35°	59·9
25°	46·9	36°	61·2
26°	48·2	37°	62·5
27°	49·5	38°	63·8
28°	50·8	39°	65·2
29°	52·1	40°	66·8
30°	53·4	41°	68·6
31°	54·7	42°	70·5
32°	56·0	43°	72·3
33°	57·3	44°	74·2
34°	58·6	45°	76·1

Freezing-point.	Per cent. w/w of Cineole.	Freezing-point.	Per cent w/w of Cineole.
46°	78·0	52°	91·3
47°	80·0	53°	93·8
48°	82·1	54°	96·3
49°	84·2	55°	99·3
50°	86·3	55·2°	100·0
51°	88·8		

The *o-cresol* used must be pure and dry, with a freezing-point not below 30°. It is hygroscopic, and should be stored in a small well-stoppered bottle, because the presence of moisture may lower the results, even to the extent of 5 per cent.

F. *DETERMINATION OF BALSAMIC ACIDS IN BALSAM OF TOLU, IN BENZOIN, AND IN STORAX*

A. Total Balsamic Acids.

Boil about 2·5 grammes, accurately weighed, with 25 millilitres of *N/2 alcoholic potassium hydroxide* under a reflux condenser for one hour; remove the alcohol, and digest the residue with 50 millilitres of hot *water*, until uniformly diffused. Cool the liquid, and add 150 millilitres of *water* and 2·5 grammes of *magnesium sulphate*, dissolved in 50 millilitres of *water*; mix thoroughly, and set aside for ten minutes. Filter the liquid through a suction filter, and wash the residue with 20 millilitres of *water*. Acidify the mixed filtrate and washings with *hydrochloric acid*, and shake successively with 50, 40, 30, and 30 millilitres of *ether*; separate the ethereal solutions; and reject the aqueous liquid. Shake the mixed ethereal solutions successively with 20, 20, 10, 10, and 10 millilitres of a 5 per cent. w/v aqueous solution of *sodium bicarbonate*, separate the aqueous liquids, and wash each with 20 millilitres of *ether*, using the same ether to wash each in succession. Reject the ethereal liquids. Acidify the mixed aqueous solutions with *hydrochloric acid*, and shake successively with 30, 20, 10, and 10 millilitres of *ether*; separate the ethereal solutions, remove most of the ether, distribute the residue over the surface of the flask, dry in a vacuum desiccator over *sulphuric acid*, and weigh the balsamic acids.

B. Free Balsamic Acids in Balsam of Tolu, and in Benzoin.

Dissolve in a 300 millilitre flask 2·5 grammes of Balsam of Tolu, or the alcoholic extractive from 2·5 grammes of Benzoin, in 15 millilitres of hot *alcohol* (*90 per cent.*), then add all at once a mixture of 10 millilitres of *solution of potassium hydroxide* and 50 millilitres of *water*; mix, and dilute with 150 millilitres of *water*; to the mixture add 2·5 grammes of *magnesium sulphate*, dissolved in 50 millilitres of *water*, and place the flask on a boiling water-bath for five minutes. Cool, and continue the *determination of total balsamic acids*, commencing with the words 'Filter the liquid through a suction filter . . .'.

APPENDIX XII

A. *DETERMINATION OF ASH*

Take about 2 or 3 grammes, accurately weighed, of the ground drug in a tared platinum or silica dish, incinerate at a low temperature until free from carbon, cool and weigh. If a carbon-free ash cannot be obtained in this way, exhaust the charred mass with hot *water*, collect the residue on an ashless filter paper, incinerate the residue and filter paper, add the filtrate, evaporate to dryness, and ignite at a low temperature. Calculate the percentage of ash with reference to the drug dried at 100°.

B. *DETERMINATION OF ACID-INSOLUBLE ASH*

Boil the *ash* for five minutes with 25 millilitres of *dilute hydrochloric acid*; collect the insoluble matter in a Gooch crucible, or on an ashless filter paper, wash with hot *water*, ignite, and weigh. Calculate the percentage of acid-insoluble ash with reference to the drug dried at 100°.

C. *DETERMINATION OF WATER-SOLUBLE ASH*

Boil the *ash* for five minutes with 25 millilitres of *water*; collect the insoluble matter in a Gooch crucible, or on an ashless filter paper, wash with hot *water*, ignite, and weigh. Subtract the weight of the insoluble matter from the weight of the *ash*; the difference in weight represents the water-soluble ash. Calculate the percentage of water-soluble ash with reference to the drug dried at 100°.

D. *DETERMINATION OF ALCOHOL-SOLUBLE EXTRACTIVE*

Macerate 5 grammes of the air-dried drug, coarsely powdered, with 100 millilitres of *alcohol*, of the specified strength, in a closed flask for twenty-four hours, shaking frequently. Filter, evaporate 25 millilitres to dryness in a flat-bottomed shallow dish, and dry at 100°. Calculate the percentage of alcohol-soluble extractive with reference to the air-dried drug.

E. *DETERMINATION OF WATER-SOLUBLE EXTRACTIVE*

Proceed as directed for the determination of *alcohol-soluble extractive*, using *chloroform water* instead of *alcohol.*

F. *DETERMINATION OF ALCOHOL CONTENT*

Proceed by one of the Methods I, II, III, or IV as directed in the *alcohol limits table.*

Method I. Measure 25 millilitres of the preparation in a graduated flask at a known temperature of about 15°. Transfer to a flask of 500 to 800 millilitres capacity, dilute with 100 to 150 millilitres of *water*, and add a little *pumice powder*. Connect the flask to a condenser by means of a suitable still-head, and distil at least 90 millilitres into a 100 millilitre graduated flask. Bring the distillate to the original temperature, and dilute to 100 millilitres with *water* at the same temperature. Determine the *specific gravity*, and the *refractive index* of the solution, and if, by reference to the *ethyl alcohol (quadruple bulk) table*, the *refractive index* does not differ by more than 0·0002 from that corresponding to the specific gravity, read off the percentage of ethyl alcohol corresponding to the *specific gravity*. If the *refractive index* differs by more than 0·0002, treat 75 millilitres of the distillate with powdered *sodium chloride* and *light petroleum (boiling-point, 50° to 60°)*, as in Method II, distil about 70 millilitres, and dilute the distillate to 75 millilitres. If the *refractive index* still does not correspond with the *specific gravity*, the distillate contains some impurity, and the *specific gravity* does not indicate the true proportion of ethyl alcohol.

Method II. Measure 25 millilitres of the preparation in a graduated flask at a known temperature of about 15°. Transfer to a separator, dilute with about 100 millilitres of *water*, and add sufficient powdered *sodium chloride* to saturate the liquid. Add about 100 millilitres of *light petroleum (boiling-point, 50° to 60°)*, and shake vigorously for two or three minutes. Allow the mixture to stand for from fifteen to thirty minutes, and run the lower layer into a distillation flask. Wash the light petroleum in the separator by shaking vigorously with about 25 millilitres of *brine*; allow to stand, and run the wash liquor into the first brine solution. Where the *alcohol limits table* directs a double separation, run the brine solution into a second separator, and shake it with a further 100 millilitres of *light petroleum* (*boiling-point, 50° to 60°*) before transferring to the distillation flask. Wash this second quantity of light petroleum with the wash liquor from the first washing. Make the mixed solutions just alkaline with *N/1 sodium hydroxide*, using solid *phenolphthalein* as indicator, add a little *pumice powder*, distil 90 millilitres, and determine the amount of ethyl alcohol, as in Method I.

Method III. Measure 25 millilitres of the preparation in a graduated flask at a known temperature of about 15°. Transfer to a flask of 500 to 800 millilitres capacity, dilute with 100 to 150 millilitres of *water*, and add a little *pumice powder*. Connect the flask to a condenser by means of a suitable stillhead, and distil about 100 millilitres. Transfer to a separator, and determine the amount of ethyl alcohol, as in Method II.

Method IV. Measure 25 millilitres in a graduated flask at a known temperature of about 15°. Transfer to a separator, dilute with about 100 millilitres of *water*, and add 100 millilitres of *light petroleum* (*boiling-point, 50° to 60°*). Add gradually 25 millilitres of a cooled mixture of 1 volume of *sulphuric acid* and 3 volumes of *water*, and shake vigorously for two to three minutes. Allow the mixture to stand for fifteen minutes, and run the lower layer into a distillation flask. Wash the light petroleum in the separator by shaking with 25 millilitres of *dilute sulphuric acid*, set aside, and run the wash liquor into the first acid solution. Add a little *pumice powder*, distil 90 millilitres, and determine the amount of ethyl alcohol, as in Method I.

The final distillate, obtained by Method I, II, III, or IV, complies with the following tests :—

(*a*) The *refractive index* corresponds to the *specific gravity*.

(*b*) When adjusted to approximately 10 per cent. alcoholic strength, either by dilution with *water* or by the addition of *alcohol* (*90 per cent.*), 5 millilitres complies with the limit test for methyl alcohol, described under 'Alcohol' (absence of Industrial Methylated Spirit).

Note.—Industrial methylated spirit must not be used in adjusting the strength of the distillate. A very faint colour, which may be due to naturally occurring methyl compounds in the ingredients of the preparation, may be disregarded.

(*c*) 1 millilitre, mixed with 2 millilitres of *solution of mercuric sulphate* and heated just to boiling-point, gives no precipitate (absence of isopropyl alcohol).

ETHYL ALCOHOL (QUADRUPLE BULK) TABLE

Specific Gravity at 15·5°/15·5° of the quadruply diluted mixture.	Percentage v/v of ethyl alcohol in the original preparation.	Proportional difference.	Refractive Index at 20° of the quadruply diluted mixture.
0·9710	99·52	3·87	1·3469
0·9720	95·65	3·89	1·3463
0·9730	91·76	3·92	1·3457
0·9740	87·84	3·94	1·3451
0·9750	83·90	3·97	1·3445
0·9760	79·93	3·97	1·3439
0·9770	75·96	3·97	1·3433
0·9780	71·99	3·94	1·3427
0·9790	68·05	3·90	1·3421
0·9800	64·15	3·83	1·3416
0·9810	60·32	3·81	1·3410
0·9820	56·51	3·71	1·3405
0·9830	52·80	3·65	1·3399
0·9840	49·15	3·57	1·3394
0·9850	45·58	3·53	1·3389
0·9860	42·05	3·46	1·3384
0·9870	38·59	3·39	1·3379
0·9880	35·20	3·27	1·3375
0·9890	31·93	3·19	1·3370
0·9900	28·74	3·15	1·3365
0·9910	25·59	3·08	1·3361
0·9920	22·51	2·99	1·3357
0·9930	19·52	2·95	1·3353
0·9940	16·57	2·89	1·3350
0·9950	13·68	2·85	1·3346
0·9960	10·83	2·76	1·3343
0·9970	8·07	2·71	1·3340
0·9980	5·36	2·71	1·3336
0·9990	2·65	2·65	1·3333
1·0000	0·00		1·3330

ALCOHOL LIMITS TABLE

Preparation.	Method of determining Alcohol Content.	Alcohol Limits per cent. v/v of ethyl alcohol.
Aqua Anethi Concentrata	II	52–56
Aqua Cinnamomi Concentrata	II	52–56
Aqua Menthæ Piperitæ Concentrata	II	52–56
Collodium Flexile	III[a]	20–23
Extractum Belladonnæ Liquidum	I	63–73
Extractum Cascaræ Sagradæ Liquidum	I	21–24
Extractum Cinchonæ Liquidum	I	21–24
Extractum Colchici Liquidum	I	50–60
Extractum Ergotæ Liquidum	I	not less than 40
Extractum Glycyrrhizæ Liquidum	I	16–20
Extractum Hamamelidis Liquidum	I	32–40
Extractum Hyoscyami Liquidum	I	60–70
Extractum Ipecacuanhæ Liquidum	I	75–80
Extractum Nucis Vomicæ Liquidum	I	36–42
Extractum Senegæ Liquidum	I[b]	44–54
Extractum Sennæ Liquidum	I	21–24
Infusum Aurantii Concentratum	III	22–25
Infusum Buchu Concentratum	I	21–25
Infusum Calumbæ Concentratum	I	21–24
Infusum Caryophylli Concentratum	I	23–25
Infusum Gentianæ Compositum Concentratum	III	20–24
Infusum Quassiæ Concentratum	I	21–24
Infusum Senegæ Concentratum	I[b]	20–24
Infusum Sennæ Concentratum	III	20–24
Linimentum Aconiti	III	75–85
Linimentum Belladonnæ	III	70–75
Linimentum Camphoræ Ammoniatum	IV	54–58
Linimentum Saponis	III[c]	61–65

[a] With double separation.
[b] Acidify with *dilute sulphuric acid* before the first distillation.
[c] Add 10 grammes of *calcium chloride* before the first distillation.

Preparation.	Method of determining Alcohol Content.	Alcohol Limits per cent. v/v of ethyl alcohol.
Liquor Glycerylis Trinitratis	II	88–90
Liquor Iodi Fortis	I[d]	76–79
Liquor Iodi Mitis	I[d]	85–88
Liquor Iodi Simplex	I[d]	92–94
Liquor Morphinæ Hydrochloridi	I	21–24
Liquor Picis Carbonis	III	75–85
Liquor Quininæ Ammoniatus	I[b]	52–54
Liquor Strychninæ Hydrochloridi	I	21–24
Spiritus Ætheris	II[a]	59–65
Spiritus Ætheris Nitrosi	II	84–88
Spiritus Ammoniæ Aromaticus	III[b]	65–70
Spiritus Cajuputi	II	80–82
Spiritus Camphoræ	II	80–82
Spiritus Chloroformi	II[a]	84–87
Spiritus Menthæ Piperitæ	II	80–82
Tinctura Asafœtidæ	III	60–65
Tinctura Aurantii	II	73–78
Tinctura Belladonnæ	I	64–69
Tinctura Benzoini Composita	III	70–77
Tinctura Calumbæ	I	57–60
Tinctura Capsici	I	57–60
Tinctura Cardamomi Composita	I	52–57
Tinctura Catechu	III	37–40
Tinctura Cinchonæ	I	64–66
Tinctura Cinchonæ Composita	III	63–67
Tinctura Cocci	I	42–45
Tinctura Colchici	I	58–60
Tinctura Digitalis	I	65–70
Tinctura Gentianæ Composita	I	41–45
Tinctura Hyoscyami	I	66–71
Tinctura Ipecacuanhæ	I	20–24
Tinctura Krameriæ	I	55–59
Tinctura Limonis	II	48–54

---

[a] With double separation.

[b] Acidify with *dilute sulphuric acid* before the first distillation.

[d] Decolourise with a strong solution of *sodium thiosulphate*, and add 25 millilitres of *solution of sodium hydroxide* immediately before distillation.

Preparation.	Method of determining Alcohol Content.	Alcohol Limits per cent. v/v of ethyl alcohol.
Tinctura Lobeliæ Ætherea	III[a]	55–63
Tinctura Myrrhæ	III	82–87
Tinctura Nucis Vomicæ	I	47–50
Tinctura Opii	I	41–46
Tinctura Opii Camphorata	III	56–60
Tinctura Quassiæ	I	43–45
Tinctura Quillaiæ	I	43–45
Tinctura Rhei Composita	I	48–53
Tinctura Scillæ	I	52–57
Tinctura Senegæ	I	57–60
Tinctura Stramonii	I	40–45
Tinctura Strophanthi	I	67–70
Tinctura Tolutana	III	80–84
Tinctura Valerianæ Ammoniata	III[b]	50–54
Tinctura Zingiberis Fortis	III	82–88
Tinctura Zingiberis Mitis	III	88–90

[a] With double separation.

[b] Acidify with *dilute sulphuric acid* before the first distillation.

G. *DETERMINATION OF INDUSTRIAL METHYLATED SPIRIT*

Proceed, as directed in the *alcohol limits table*, by one of the Methods I, II, III, or IV, described under the *determination of alcohol content*, omitting the determination of the refractive index of the distillate.

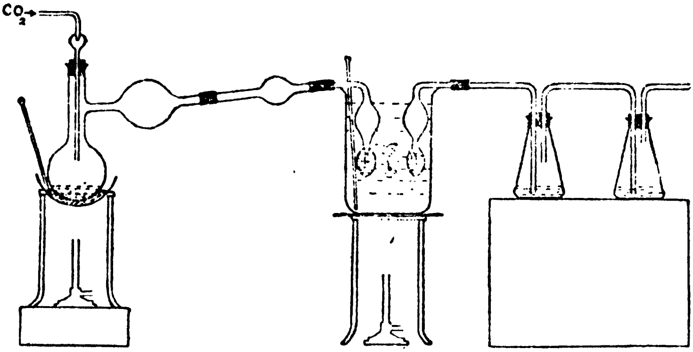
The final distillate complies with the following tests:—

(1) When adjusted to approximately 10 per cent. alcoholic strength, either by dilution with *water* or by concentration by redistillation, 5 millilitres, tested for methyl alcohol as described under 'Alcohol', gives a violet-coloured solution of an intensity similar to that produced, when 0·5 millilitre of *industrial methylated spirit*, diluted with *water* to 5 millilitres, is similarly treated.

(2) One millilitre, mixed with 2 millilitres of *solution of mercuric sulphate*, and heated just to boiling-point, gives no immediate precipitate (absence of isopropyl alcohol).

H. *DETERMINATION OF METHOXYL*

Weigh accurately about 0·2 gramme of the substance in a small glass tube, and introduce it into the distillation flask, which is made of resistance glass, and the bulbs of which are each of about 70 millilitres capacity. Add 10 millilitres of *hydriodic acid.* Connect the flask by rubber tubing to the straight bulbed tube, the two glass ends being brought into contact within the rubber tubing. Connect the other end of the bulbed tube to the set of bulbs, which are suspended in water at 60° and contain *red phosphorus* in suspension in a 2 per cent. w/v solution of *cadmium sulphate* in *water.* Connect by means of rubber tubing the bulbs with two absorption flasks in series, each containing 20 millilitres of *alcoholic solution of silver nitrate.* Pass a slow stream of *carbon dioxide* through the apparatus, and heat the distilling flask in a bath of fusible metal, the temperature being maintained at 140°, until any further precipitate ceases to be formed in the absorption flasks. When this point has been reached, wash the contents of the absorption flasks into a beaker, evaporate the solution until free from alcohol, add a little *nitric acid,* and filter through a tared Gooch crucible. Wash the precipitate with hot *water,* and finally with 2 or 3 millilitres of *alcohol* (*95 per cent.*); dry at 120°, and weigh. Each gramme of precipitate corresponds to 0·1321 gramme of methoxyl (CH_3O).



I. *DETERMINATION OF SULPHUR DIOXIDE*

Apparatus. A round-bottomed flask of 1000 to 1500 millilitres capacity is connected with a reflux water-cooled condenser, the upper end of which is connected with two absorption tubes in series. The flask is provided with a gas inlet tube, which reaches nearly to the bottom of the flask. Each absorption tube contains 10 millilitres of *solution of hydrogen peroxide,* neutralised with *N/10 sodium hydroxide, solution of bromophenol blue* being used as indicator.

Method. Place in the flask 500 millilitres of *water* and 20 millilitres of *hydrochloric acid.* Connect it with the condenser and absorption tubes, and heat the liquid gradually until it boils, while passing through it a steady current of *carbon dioxide,* which has been bubbled through *solution of sodium carbonate.* Maintain the current of *carbon dioxide*; allow the solution to boil for about ten minutes, then cool the flask by gradual immersion in water. Introduce, by momentarily removing the stopper of the flask, 50 to 100 grammes of the material to be tested, then heat gently, and boil for forty-five minutes. Turn off the current of *carbon dioxide,* disconnect the absorption tubes, and titrate the contents with *N/10 sodium hydroxide.* Each millilitre of *N/10 sodium hydroxide* is equivalent to 0·0032 gramme of sulphur dioxide.

Repeat the operation without the material to be tested; the solution in the absorption tubes remains neutral.

APPENDIX XIII

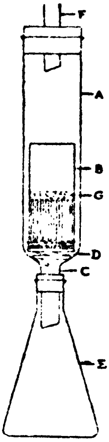
SPECIAL PROCESSES USED IN ALKALOIDAL ASSAYS

A. Continuous Extraction of Drugs

Continuous extraction of a drug, for the purpose of an assay, consists in percolating the drug with a suitable solvent, at a temperature approximately that of the boiling-point of the solvent.

The apparatus described below is recommended, but any similar apparatus may be used, provided that it permits the uniform percolation of the drug and the regular flow of the vapour of the solvent around the percolator.

The apparatus is shown in the accompanying illustration. A is an outer tube of stout glass; the wider part is about 18 centimetres in length and has an internal diameter of 4·8 to 5 centimetres; the lower end C is about 5 centimetres in length and has an external diameter of about 1·6 centimetres. B is a straight glass tube open at both ends, about 9 centimetres in length and having an external diameter of about 3·8 centimetres; over its lower flanged end is tied firmly a piece of calico or other suitable material. D is a glass coil, which supports the margin of the tube B and prevents it from resting in contact with the outer tube A. The lower end C of the outer tube A is fitted by a cork to the distilling flask E, in which a suitable quantity of the solvent has been placed. The drug to be extracted, previously moistened with the solvent or subjected to any preliminary treatment required, is introduced into the inner tube B, which is supported so that the percolate drops into the outer tube. A pad of cotton wool G is placed on the top of the drug, the inner tube is lowered into position, and the outer tube connected by means of a suitable cork with the tube of a reflux condenser F. The flask is heated, and the extraction continued as directed.



B. TESTS FOR COMPLETE EXTRACTION OF ALKALOIDS

1. When extracting with an Aqueous Liquid.

After extracting at least three times with the liquid, add to a few drops of the next portion 1 drop of *solution of potassio-mercuric iodide* and, if necessary, a few drops of *dilute hydrochloric acid*, or, in the case of colchicum, 1 drop of *solution of iodine*; no precipitate, or turbidity, is produced.

2. When extracting with an immiscible solvent.

After extracting at least three times with the solvent, evaporate about 1 to 2 millilitres of the next portion, dissolve the residue in a few drops of the appropriate acid, and add 1 drop of *solution of potassio-mercuric iodide*, or, in the case of colchicine, of caffeine, or of emetine, 1 drop of *solution of iodine*; not more than a very faint opalescence is produced.

APPENDIX XIV

ANTIMONY TRICHLORIDE TEST FOR COD-LIVER OIL

0·04 gramme of Cod-liver Oil, examined by the following method, gives a blue colour not less saturated, that is to say not paler, than that of a blue glass, standardised to have the following properties on the system of colour measurement adopted at the National Physical Laboratory, Teddington.

Colour Quality: 0·137R + 0·271G + 0·592B
Photometric transmission: 34·0 per cent.

In the foregoing specification, R, G and B respectively denote the colours of monochromatic radiations of wavelengths 0·700μ, 0·546μ and 0·436μ, and the measurements, both of colour quality and photometric transmission, are presumed to be made with the National Physical Laboratory standard 'white' light.

Description of Test.

Weigh accurately 2·00 grammes into a narrow-necked 10 millilitre measuring flask, fill to the mark with *chloroform* at a temperature of 20°, and mix. Take 0·2 millilitre of this solution, measured at 20° by means not less accurate than a 1 millilitre pipette, the graduated portion of which is at least 15 centimetres long. Put it in a colourless rectangular glass cell of 10 millimetres internal measurement in the direction of observation. Place the glass cell in a colorimeter, designed for matching the colour of the solution against colour glasses. Add rapidly 2 millilitres of *antimony trichloride reagent*, in such a way that the solutions mix. Simultaneously observe the development of a blue colour, which rapidly reaches a maximum and then fades. By means of combinations of graded colour glasses, match the colour at the point of maximum intensity.

It may be necessary to employ yellow and red, as well as blue, glasses.

In order to obtain an accurate match, it may be necessary to diminish the transparency on the side of the cell; this must be done by adding on that side neutral tinted glasses, the value of which should be disregarded.

Several preliminary observations must be made, in order to enable subsequent readings to be taken without undue delay in arranging the glasses, and to determine how long after mixing the point of maximum intensity of colour is attained. The maximum intensity may develop within ten seconds, but the time varies with different oils. It is essential to make the final match at the point of maximum intensity of the blue colour.

Neither the solution to be tested, nor the *antimony trichloride* reagent, must come into contact with rubber.

Antimony Trichloride Reagent.

A solution of antimony trichloride in pure dry chloroform, saturated at 20°, is prepared in the following way:—Wash *chloroform* two or three times with its own volume of *water*, and dry it over *anhydrous potassium carbonate*; pour off and distil, rejecting the first 10 per cent. of the distillate. During drying and distillation protect the chloroform from light. Wash *antimony trichloride* with the pure dry chloroform, until the washings are clear. Prepare a solution, saturated at 20°, of the washed antimony trichloride in the pure dry chloroform. The solution contains not less than 21 per cent. w/v, and not more than 23 per cent. w/v, of $SbCl_3$, and should be kept in a well-stoppered bottle of amber-coloured glass.

Assay. Mix 1 millilitre with a solution of 2 grammes of *sodium potassium tartrate* in 20 millilitres of *water*, rotate the mixture, add 2 grammes of *sodium bicarbonate*, and titrate with *N/10 iodine*. Each millilitre of *N/10 iodine* is equivalent to 0·01141 gramme of $SbCl_3$.

APPENDIX XV

A. *BIOLOGICAL ASSAY OF ANTIRACHITIC VITAMIN (VITAMIN D)*

The activity of a preparation of antirachitic vitamin (vitamin D) is determined by comparing its antirachitic activity with that of the Standard Preparation of Antirachitic Vitamin (Vitamin D) by a suitable method: when so determined it is expressed in Units per gramme.

1. Standard Preparation of Antirachitic Vitamin (Vitamin D).

The Standard Preparation for Great Britain and Northern Ireland is kept in the National Institute for Medical Research, Hampstead, London. The Standard Preparation for other parts of the British Empire is the same, except for those countries in which a similar standard preparation, kept in a different institute, has been defined by law; in these countries the standard preparation, so defined, is used.

2. The Unit of Antirachitic Activity (Vitamin D).

The Unit of antirachitic activity (Vitamin D) for Great Britain and Northern Ireland is defined as the specific activity contained in such an amount of the Standard Preparation as the Medical Research Council may from time to time indicate as the quantity exactly equivalent to the unit accepted for international use. The Unit for other parts of the British Empire is the same, except for those countries in which a similar unit has been defined by law; in these countries the unit, so defined, is used.

3. Suggested Details of Method.

(*a*) *Curative.* Not less than 40 Young rats ranging in weight from 40 to 60 grammes are used for the test. About ~~twenty~~ 40 are selected from ~~three to four litters~~ 10 litters, the heaviest not exceeding the lightest by more than 10 grammes. They are fed for about three weeks on a rachitogenic diet which may consist of :—

Ground yellow maize	33 per cent.
Whole wheat	33 per cent.
Wheat gluten	15 per cent.
Gelatin	15 per cent.
Calcium carbonate	3 per cent.
Sodium chloride	1 per cent.

or

Ground yellow maize	76 per cent.
Wheat gluten	20 per cent.
Calcium carbonate	3 per cent.
Sodium chloride	1 per cent.

The degree of rickets may be determined in each rat by taking X-ray photographs of the bones, See below (Cont.)

The rats are divided into ~~two~~ groups, so that as far as possible rat from each litter set

of four or 2 rats from each litter set

the rats of each litter are evenly divided between the groups. The rats in ~~one~~ groups receive daily doses of the Standard Preparation, while the rats in the other group receive daily doses of the preparation being tested. A suitable dose of the Standard Preparation is about 0·25 Unit. Different rats receive different daily doses, but any one rat receives the same dose on each day, and the doses are continued for a period of 10 to 14 days.

The rats are killed, and the extent to which the rickets has been cured is estimated either by means of X-ray photographs, or by examination of the bones after staining. In order to stain the bones, the distal ends of the ulnæ and radii may be removed, immersed for twenty-four hours in 4 per cent. w/v aqueous solution of formaldehyde, cut in halves by longitudinal section, immersed in 1·5 per cent. w/v aqueous solution of *silver nitrate* for a few minutes, and exposed to light.

The bones of the rats, which received the preparation being tested, are compared with the bones of the rats, which received the Standard Preparation, in order to determine what dose of the preparation being tested has produced the same degree of healing of rickets as a given dose of the Standard Preparation. The degree of healing produced by a given dose is not the same in every rat, therefore the average effect of a dose of the preparation being tested in a group of rats should be compared with the average effect of a dose of the Standard Preparation in another group of rats.

When the average effect of any dose of the preparation being tested is not the same as the average effect of a dose of the Standard Preparation, information about the activity of the preparation being tested, in terms of the Standard Preparation, can be gained from the results, provided that the average effect in groups of rats of a series of different doses of the Standard Preparation has been previously determined. The difference between the activity of the preparation being tested and that of the Standard preparation can then be determined from the difference between the average effect produced by the preparation being tested and that produced by the Standard Preparation. A difference of 50 per cent., or more, in potency can be detected by this test.

(*b*) *Prophylactic.* About ~~twenty~~ 32 young rats, each ~~weighing 40 to 50 grammes~~, from three or four litters, are fed on one of the rachitogenic diets described in (*a*) for about four or five weeks. During this period they are divided into ~~two~~ groups, so that each litter is evenly divided between the groups. The rats of one group receive daily doses of the preparation being tested, and the rats of the other groups receive daily doses of the Standard Preparation, in the ratio of 2:5. A suitable dose of the Standard Preparation is about 0.025 0·1 Unit. A given daily dose, whether of the preparation being tested or of the Standard Preparation, is administered to each of not less than five rats.

At the end of the period the rats are killed, and corresponding bones are taken from every rat. Moisture and fat are removed from the bones by a suitable method, such as the following:—the bones are dried at 105° and extracted with boiling ~~dehydrated~~ *alcohol* 95% for eight hours under a reflux condenser; ~~they are then extracted with~~ ~~*ether in*~~ a ~~*continuous extraction*~~ ~~apparatus~~ for ~~twenty-four hours~~. The bones are weighed, incinerated in a crucible, and the weight of the ash determined. The percentage of ash in the bone is calculated.

The average percentage of ash in the bones of the rats of each, which received the same doses, is then calculated & compared as in (A). A dose of the preparation being tested, which has produced the same average percentage of ash as that produced in another group of bones by a known dose of the Standard Preparation, can then be compared in activity with this dose of the Standard Preparation, and the activity of the preparation being tested can be expressed in Units.

If the average percentage of ash in the bones of the rats, which received doses of the preparation being tested, is not the same as that in the bones of the rats, which received doses of the Standard Preparation, the test is repeated, using doses of the preparation being tested, which, judging from the previous test, will produce an average percentage of ash the same as that produced by known doses of the Standard Preparation.

[illegible]: Determined from the Data of Exp. Estimate of the slope of the line to the log of the dose does not exceed 8 times its standard error, [illegible]

B. *BIOLOGICAL ASSAY OF ANTI-DYSENTERY SERUM (SHIGA)*

CAUTION—In any part of the British Empire in which Anti-dysentery Serum (Shiga) is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

The potency of an anti-dysentery serum is determined by comparing the dose of it, necessary to protect mice against the lethal effect of dysentery toxin, with the dose of a standard preparation of Anti-dysentery Serum (Shiga), necessary to give the same protection. For this comparison there are necessary, (*a*) The Standard Preparation of Anti-dysentery Serum (Shiga), and (*b*) a preparation of toxin of known toxicity.

1. Standard Preparation of Anti-dysentery Serum (Shiga).

The Standard Preparation for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925. The Standard Preparation is a quantity of dried serum, obtained from horses immunised against the toxic constituents of the *Bacillus dysenteriæ* (Shiga), and is kept in the National Institute for Medical Research, Hampstead, London. The Standard Preparation for other parts of the British Empire is the same, except for those countries in which a similar standard preparation, kept in a different institute, has been defined by law; in these countries the standard preparation, so defined, is used.

2. The Unit of Anti-dysentery Serum (Shiga).

The Unit for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925. The Unit is the specific neutralising activity for the *Bacillus dysenteriæ*, (Shiga), contained in such an amount of the Standard Preparation as the Medical Research Council may from time to time indicate as the quantity exactly equivalent to the unit accepted for international use. The Unit for other parts of the British Empire is the same, except for those countries in which a similar unit has been defined by law; in these countries the unit, so defined, is used.

3. Suggested Details of Method.

A. PREPARATION OF TEST TOXIN.

Toxins suitable for use in the test may be prepared by one of the following methods:—

(*a*) *Bacillary Emulsion.* A smooth strain of a highly toxigenic *Bacillus dysenteriæ* (Shiga) is grown on nutrient agar for forty-eight hours at 37°. The culture is washed off the medium with *water*, and the resulting suspension is heated at 56° for fifteen minutes, and then centrifuged. The mass of bacilli is removed, dried in vacuo over *phosphorus pentoxide*, ground to a fine powder, and kept dry.

(*b*) *Broth Filtrate.* A highly toxigenic strain of the bacillus is grown for two or three weeks in an alkaline broth at 37°. The medium is freed from bacilli by passage through a bacteria-proof filter. If it is found to be of suitable toxicity, the toxin is precipitated by adding 40 grammes of *ammonium sulphate* to each 100 millilitres of filtrate. The precipitate is collected, dried in vacuo over *phosphorus pentoxide,* powdered, and kept dry.

(*c*) *Purified Toxin.* A suitable strain of the bacillus is grown for six weeks in nutrient broth, and the medium is freed from bacilli by passage through a bacteria-proof filter. The filtrate is freed from electrolytes, and partially concentrated by dialysis under pressure against *water.* The *reaction* is adjusted to the isoelectric point, whereupon the toxin is precipitated, and can be collected, dried in vacuo over *phosphorus pentoxide,* and kept dry.

B. SELECTION OF TOXIN.

A toxin having been prepared by one of the above methods, the average lethal dose and the test dose of it are determined. The toxin is satisfactory, if the test dose contains not less than 20 average lethal doses.

(*a*) *Determination of Average Lethal Dose.* The average lethal dose is the dose, which causes the death of about one half of a group of mice injected with it. For this determination mice weighing between 15 and 18 grammes are used, and the solution of the toxin is injected into the tail vein.

(*b*) *Determination of the Test Dose.* The test dose of the toxin is that dose which, when mixed with a volume of the Standard Preparation containing 1 Unit, causes the death of one half of a group of not less than 30 mice, each injected with the mixture. Each mixture of the toxin and Standard Preparation must be freshly prepared and adjusted to a volume of 0·5 millilitre; the mixture is kept at 37° for forty-five minutes, and is then injected into the tail vein. The mice used must weigh between 15 and 18 grammes. After the injection has been made, they are observed during the next seven days. The determination must be made with great care and, when once it is made, the toxin may be used for estimating the antitoxic activity of many samples of serum.

C. DETERMINATION OF THE POTENCY OF A SAMPLE OF SERUM TO BE ASSAYED.

The potency of a sample of serum is determined by injecting into mice a mixture of it and the test dose of toxin, and comparing the percentage mortality, which follows, with that produced by injecting into other mice at the same time mixtures of the test dose of the toxin and 1 Unit of the Standard Preparation.

Though the test dose of the toxin has been selected as that producing, when mixed with 1 Unit of antitoxin, a mortality rate of about 50 per cent. in the mice injected with it, it is not to be expected that this mixture will produce a mortality approximating closely to this percentage in every group of mice receiving it.

1. **Preliminary Test.** Mice weighing between 15 and 18 grammes are injected with mixtures of the test dose of toxin and doses of the serum being tested, freshly prepared and incubated at 37° for forty-five minutes before injection. A mixture of the test dose of toxin and any one dose of the serum being tested is given to each of a small group of mice. The doses of serum are spread over a wide range. In this way a rough estimate is obtained of the dose of serum, which protects one half of the mice injected from the action of the test dose of toxin.

2. **Final Test.** Sixty mice are divided into two groups. Each of the mice in one group receives a mixture of the test dose of toxin and the dose of the serum being tested determined in the preliminary test, while each of the mice in the second group receives a mixture of the test dose of toxin and 1 Unit of the Standard Preparation. The percentage mortalities during seven days in each group are observed. If they are the same, it is concluded that the dose of the serum being tested, which was used, contained 1 Unit.

If the percentage mortalities are different, the experiment is repeated, adjusting the dose of the serum being tested to a dose which will, when mixed with the test dose of toxin, produce the same percentage mortality as the mixture of the test dose of toxin and 1 Unit of the Standard Preparation. To make this adjustment the following table may be taken as a guide:—

Percentage Mortality.	Potency.
10	170
20	142
30	124
40	111
50	100
60	90
70	80
80	71
90	60

Thus, if the observed percentage mortality was 20, then in order to obtain a percentage mortality near to 50, the dose of the serum being tested should in the second experiment be $^{100}/_{142}$ of that previously taken.

The percentage mortalities in the second experiment may then be sufficiently near together to enable the amount of the serum being tested, which is equivalent to 1 Unit of the Standard Preparation, to be determined. The determination, however, is not completed unless the percentage mortalities do not differ by more than 10 per cent.

The final determination of the potency of the serum being tested may be shortened by first determining, for the actual toxin employed, the relation between varying amounts of the Standard Preparation, in mixtures with the test dose of toxin, and the percentage mortalities which those mixtures cause, when injected into large groups of mice. This relation having been carefully determined and a table drawn up, the potency of a serum to be tested can then be evaluated by one experiment in the Final Test. If the observed percentage mortalities in the two groups differ, the dose of the serum to be tested which, mixed with the test dose of toxin, would have given the same percentage mortality as that given by the mixture of the test dose of toxin and the Standard Preparation, can be calculated by reference to the table, which the worker has determined for himself.

C. *BIOLOGICAL ASSAY OF DIPHTHERIA ANTITOXIN*

CAUTION.—In any part of the British Empire in which Diphtheria Antitoxin is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

The potency of a sample of diphtheria antitoxin is determined by comparing the dose of it, necessary to protect guinea-pigs against the effect of a fixed dose of diphtheria toxin, with the dose of a standard preparation of Diphtheria Antitoxin, necessary to give the same protection. For this comparison there are necessary, (*a*) the Standard Preparation of Diphtheria Antitoxin, and (*b*) a suitable preparation of diphtheria toxin for use as a test toxin. The potency of this test toxin is first determined in relation to the Standard Preparation by a satisfactory method. The potency of samples of diphtheria antitoxin to be tested is then determined in relation to the potency of the test toxin by the same method.

1. Standard Preparation of Diphtheria Antitoxin.

The Standard Preparation for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925. The Standard Preparation is a quantity of dried diphtheria antitoxin kept in the National Institute for Medical Research, Hampstead, London. The Standard Preparation for other parts of the British Empire is the same, except for those countries in which a similar standard preparation, kept in a different institute, has been defined by law; in these countries the standard preparation, so defined, is used.

2. The Unit of Diphtheria Antitoxin.

The Unit for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925. The Unit is the specific neutralising activity for diphtheria toxin, contained in such an amount of the Standard Preparation as the Medical Research Council may from time to time indicate as the quantity exactly equivalent to the unit accepted for international use. The Unit for other parts of the British Empire is the same, except for those countries in which a similar unit has been defined by law; in these countries the unit, so defined, is used. Is contained in 0·1279 mg of the Standard Prep at the

3. Suggested Details of Method.

A. Preparation of Test Toxin.

Diphtheria toxin is prepared by filtering through a bacteria-proof filter the fluid medium on which the *Corynebacterium diphtheriæ* has grown.

B. SELECTION OF TOXIN FOR USE AS A TEST TOXIN.

1. *Selection of Test Toxin.*

In selecting a toxin for use as a test toxin, the following quantities of the sample are determined :—

(*a*) *The lethal dose.* This is the smallest quantity of the toxin which, administered by subcutaneous injection to guinea-pigs from 250 to 270 grammes in weight, causes the death of the majority within five days, the animals exhibiting the uncomplicated symptoms of the toxæmia of diphtheria.

(*b*) *The L_+ dose.* This is the smallest quantity of the toxin which, mixed with 1 Unit of Diphtheria Antitoxin and injected under the skin of a guinea-pig weighing 250 to 270 grammes, causes death within ~~five~~ four days, the animal exhibiting the uncomplicated symptoms of the toxæmia of diphtheria.

(*c*) *The L_0 dose.* This is the largest quantity of the toxin which, mixed with 1 Unit of Diphtheria Antitoxin and injected under the skin of a guinea-pig weighing 250 to 270 grammes, fails to produce any local or general reaction.

In determining the L_+ and the L_0 doses, the mixtures of test toxin and antitoxin are made so that the total volume of the mixture is 4 millilitres ; each mixture is allowed to stand, at room temperature, protected from light, for not less than fifteen minutes, and not more than sixty minutes, before injection.

A suitable toxin has a lethal dose lying between 0·01 and 0·001 millilitres, and the difference between its L_+ and its L_0 doses does not exceed fifteen times the lethal dose.

2. *Storage of Test Toxin.*

The test toxin is stored in the dark at a temperature not lower than 0°, and not higher than 5°. Its sterility is preserved by the addition of *toluene.*

3. *Stability of Test Toxin.*

The test toxin is set aside for some months before being used for the assay of samples of antitoxin. During this time the toxicity declines, as shown by an increase in the lethal dose, usually accompanied by some increase in the value of the L_+ dose. When experiment shows that the L_+ dose is no longer changing, the test toxin is ready for use, and may be used for long periods ; but in the course of two or three years the toxicity may begin to decline once more, therefore, frequent redetermination of the L_+ dose is necessary.

C. DETERMINATION OF THE POTENCY OF A SAMPLE OF ANTITOXIN.

To determine the potency of a sample of antitoxin, mixtures are made containing the L_+ dose of the test toxin with different volumes of the antitoxin. The total volume of each mixture is adjusted to 4 millilitres, and each mixture is allowed to stand, protected from light, for not less than fifteen minutes, and not more than sixty minutes, at room temperature. Each mixture is then injected under the skin of a guinea-pig weighing from 250 to 270 grammes. The volume of antitoxin in the mixture, which causes the death of a guinea-pig after an interval of four days, contains 1 Unit. For example, if an animal injected with a mixture containing 1/500th millilitre of antitoxin dies in less than four days, while that receiving a mixture containing 1/400th millilitre of antitoxin survives for more than that period, then the antitoxin contains more than 400, but less than 500 Units per millilitre. By further tests, within these limits, the dose of the antitoxin, which gives protection just for four days, is found; this quantity contains 1 Unit.

The limit of error is ± 10 per cent.

D. *BIOLOGICAL ASSAY OF GAS-GANGRENE ANTITOXIN (PERFRINGENS)*

CAUTION.—In any part of the British Empire in which Gas-gangrene Antitoxin is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

The potency of a sample of gas-gangrene antitoxin (perfringens) is determined by comparing the dose of it, necessary to protect mice or other suitable animals against the lethal effect of gas-gangrene toxin, with the dose of a standard preparation of Gas-gangrene Antitoxin (perfringens), necessary to give the same protection. For this comparison there are necessary, (*a*) the Standard Preparation of Gas-gangrene Antitoxin (perfringens), and (*b*) a suitable preparation of gas-gangrene toxin for use as a test toxin. The potency of this test toxin is first determined in relation to the Standard Preparation by a satisfactory method. The potency of samples of gas-gangrene antitoxin (perfringens) to be tested is then determined in relation to the potency of the test toxin by the same method.

1. Standard Preparation of Gas-gangrene Antitoxin (Perfringens).

The Standard Preparation for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925. The Standard Preparation is a quantity of dried gas-gangrene antitoxin (perfringens) kept in the National Institute for Medical Research, Hampstead, London. The Standard Preparation for other parts of the British Empire is the same, except for those countries in which a similar standard preparation, kept in a different institute, has been defined by law; in these countries the standard preparation, so defined, is used.

2. The Unit of Gas-gangrene Antitoxin (Perfringens).

The Unit for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925. The Unit is the specific neutralising activity for gas-gangrene (perfringens) toxin, contained in such an amount of the Standard Preparation as the Medical Research Council may from time to time indicate as the quantity exactly equivalent to the unit accepted for international use. The Unit for other parts of the British Empire is the same, except for those countries in which a similar unit has been defined by law; in these countries the unit, so defined, is used.

3. Suggested Details of Method.

A. PREPARATION OF TEST TOXIN.

Gas-gangrene toxin is prepared from a sterile filtrate of culture ~~a sixteen-hour growth of *Bacillus perfringens*~~ (*Bacillus Welchii*) by precipitation with *ammonium sulphate*; the resulting precipitate is collected, dried in vacuo over *phosphorus pentoxide*, powdered, and kept dry.

B. SELECTION OF TEST TOXIN.

A suitable toxin is one which is lethal for mice when injected intravenously in a dose of 0·2 milligram, or less, and which has a test dose as defined below of 4·0 milligrams, or less. See later

Determination of the Test Dose. A quantity of the dried toxin is accurately weighed, and dissolved in *physiological solution of sodium chloride*, so that each millilitre contains a precise amount, such as 10 milligrams. The Standard Preparation is issued as a solution in a mixture of 1 volume of *physiological solution of sodium chloride* and 2 volumes of *glycerin*; the solution contains 20 Units in 1 millilitre. This solution of the Standard Preparation 1 volume is diluted with *physiological solution of sodium chloride*, 19 vols so that each millilitre contains 1 Unit.

Mixtures are made so that 0·5 millilitre of each mixture contains 0·2 millilitre of the solution of the Standard Preparation and a varying quantity of the solution of the toxin. The total volume of each mixture is adjusted by dilution with *physiological solution of sodium chloride.*

The mixtures are allowed to stand at room temperature for forty-five to sixty minutes, and are then injected into mice. The mice used are drawn from a uniform stock, and are preferably not less than 17 grammes, and not more than 20 grammes, in weight. A dose of 0·5 millilitre of each mixture is injected into the tail vein of each of six mice. The mice are thereafter observed for forty-eight hours.

The test dose of toxin is the amount present in 0·5 millilitre of that mixture, which causes the death of some of the mice but not of all of them, provided that mixtures containing larger amounts of toxin cause the death of all the mice injected, and that mixtures containing smaller amounts of toxin fail to kill any of the mice injected.

C. Determination of the Potency of a Sample of Antitoxin.

A Test quantity of the test toxin is accurately weighed, and dissolved in *physiological solution of sodium chloride*, so that 0·2 millilitre contains the test dose.

A mixture is made so that 0·5 millilitre of the mixture contains 0·2 millilitre of the solution of toxin and ~~an~~ different amounts of the antitoxin being tested ~~which is expected to contain 0·2 Unit.~~ The total volume of the mixture is adjusted by dilution with *physiological solution of sodium chloride.* The mixture is allowed to stand at room temperature ~~for forty-five to~~ for sixty minutes, and a dose of 0·5 ml is injected into each of ~~six~~ 2 mice under the same conditions as are described for the determination of the test dose of the toxin.

If none of the mice is killed, 0·5 millilitre of the mixture contains more than 0·2 Unit of antitoxin; similarly if all of the mice are killed, 0·5 millilitre of the mixture contains

(2) final Test

less than 0·2 Unit of antitoxin. Fresh mixtures are made, containing in each 0·5 millilitre the test dose of toxin and ~~either smaller or larger~~ intermediate amounts of antitoxin, between the above extremes, and injected into mice. A further mixture is made with diltd Standard Prep, so in 0·

Then The amount of the antitoxin being tested present in 0·5 millilitre of that mixture which, when injected, protects some of the mice, but not all of them, is 0·2 Unit, ~~provided that mixtures containing larger amounts of the antitoxin protect all of the mice, and that mixtures containing smaller amounts of the antitoxin fail to protect any of the mice.~~ provided it kill same number of m or most nearly the same the mixture which contains 0 of antitoxin in ·5 ml.

The limit of error is ~~± 10 per cent~~.

82·5 — 121 % when 2 animals used.
87·5 — 114 % " 4 " "
89·5 — 112 % " 6 " "

E. *BIOLOGICAL ASSAY OF TETANUS ANTITOXIN*

CAUTION.—In any part of the British Empire in which Tetanus Antitoxin is controlled by law, care must be taken that the provisions of such law are duly complied with. (*See page 12.*)

The potency of a sample of tetanus antitoxin is determined by comparing the dose of it, necessary to protect guinea-pigs or mice against the lethal effect of a fixed dose of tetanus toxin, with the dose of a standard preparation of Tetanus Antitoxin, necessary to give the same protection. For this comparison there are necessary, (*a*) the Standard Preparation of Tetanus Antitoxin, and (*b*) a suitable preparation of tetanus toxin for use as a test toxin. The potency of this test toxin is first determined in relation to the Standard Preparation by a satisfactory method. The potency of samples of tetanus antitoxin to be tested is then determined in relation to the potency of the test toxin by the same method.

1. Standard Preparation of Tetanus Antitoxin.

The Standard Preparation for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925. The Standard Preparation is a quantity of dried tetanus antitoxin kept in the National Institute for Medical Research, Hampstead, London. The Standard Preparation for other parts of the British Empire is the same, except for those countries in which a similar standard preparation, kept in a different institute, has been defined by law; in these countries the standard preparation, so defined, is used.

2. The Unit of Tetanus Antitoxin.

The Unit for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925. The Unit is the specific neutralising activity for tetanus toxin, contained in such an amount of the Standard Preparation as the Medical Research Council may from time to time indicate as the quantity exactly equivalent to the unit accepted for international use. This Unit is one half of the unit established in the United States of America under the Authority of an Act of the 1st of July, 1902. The Unit for other parts of the British Empire is the same, except for those countries in which a similar unit has been defined by law; in these countries the unit, so defined, is used. The unit is contained in 0·1330 mg of preparation at presen

3. Suggested Details of Method.

A. Preparation of Test Toxin. Test toxin may also be pre in sterile filtrate to glycerin

The test toxin may also be prepared as a dry product by saturating with *ammonium sulphate* the sterile filtrate from anaerobic cultures of ~~*Bacillus*~~ Clostridium *tetani*. The precipitate so obtained is dried ~~on porous plates~~ over P_2O_5, ground to a fine powder, and preserved either in sealed ampoules or in vacuo over *phosphorus pentoxide*. or in a dry place at low temperatures. The dry product preserved in these ways is stable.

B. Determination of the Potency of the Test Toxin.

To estimate the potency of the test toxin, the $L_{\dagger}$ and the L_0 doses are determined.

(*a*) *The $L_{\dagger}$ Dose.* This is the smallest quantity of the toxin which, when mixed with 0·2 Unit of Tetanus Antitoxin and injected under the skin of guinea-pigs or mice, causes death on the fourth day following that on which the injection is made, the animals exhibiting the symptoms of tetanus.

(*b*) *The L_0 Dose.* This is the largest quantity of the toxin which, when mixed with 0·2 Unit of Tetanus Antitoxin and injected under the skin of guinea-pigs or mice, is prevented by such admixture from causing symptoms of tetanus.

Guinea-pigs weighing from 340 to 360 grammes, or mice weighing from 17 to 20 grammes, may be used for the assay.

A quantity of the test toxin is accurately weighed and dissolved in a convenient volume of *physiological solution of sodium chloride*. Mixtures of the test toxin and of the

Standard Preparation are made so that, if guinea-pigs are used for the test, the dose of test toxin mixed with 0·2 Unit of the Standard Preparation is contained in a volume of 4 millilitres, and, if mice are used, in a volume of 0·4 to 0·6 millilitre. The mixtures are allowed to stand at room temperature, protected from light, for at least one hour before being injected. After injection, the animals are observed for the period necessary ... the L+ & L0 or their doses ... daily observations of the

When the L_{+} dose and L_0 dose of the test toxin have been determined, a concentrated solution of the test toxin in a mixture of ~~equal~~ volumes of *physiological solution of sodium chloride* and *glycerin* may be prepared, (or 1 to 2) preserved at 0°, and diluted as required. The activity of this solution should be redetermined at frequent intervals.

C. Determination of the Potency of a Sample of Antitoxin.

ad Known volumes of the sample of the antitoxin to be tested are mixed with one L_{+} dose, or, alternatively, with one L_0 dose, into of the test toxin, and, after being allowed to stand for one hour at room temperature, protected from light, are injected subcutaneously into the test animals. If the L_{+} dose of the test toxin is employed in the test, the volume of the antitoxin, which protects the animals for four days, contains 0·2 Unit; if the L_0 dose of the test toxin has been used, the volume of the antitoxin, which is just sufficient to protect the injected animals from the appearance of symptoms of tetanus, contains 0·2 Unit; if a dose intermediate between two is

The potency of a sample is expressed in Units per millilitre, or Units per gramme.

The limit of error is ± 20 per cent.

the Volume of antitoxin which for example protects the animals but not from appearance of Symptoms of Tetanus, contains 0·2

See Note 1

F. *BIOLOGICAL ASSAY OF INSULIN*

CAUTION.—In any part of the British Empire in which Insulin is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

The potency of a sample of insulin is determined by comparing the dose of it, necessary to produce hypoglycæmia in rabbits, or convulsions in mice, with the dose of the Standard Preparation of Insulin, necessary to give the same effects.

1. Standard Preparation of Insulin.

The Standard Preparation for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925. The Standard Preparation is a quantity of dry soluble insulin hydrochloride, prepared and kept in the National Institute for Medical Research, Hampstead, London. The Standard Preparation for other parts of the British Empire is the same, except for those countries in which a similar standard preparation, kept in a different institute, has been defined by law; in these countries the standard preparation, so defined, is used. For these ~~[illegible]~~ Laboratory Standard may be used provided Director approves it as accurately assayed in terms of Sta

2. The Unit of Insulin.

The Unit for Great Britain and Northern Ireland is the specific activity, contained in such an amount of the Standard Preparation as the Medical Research Council may from time to time indicate as the quantity exactly equivalent to the unit accepted for international use. The Unit for other parts of the British Empire is the same, except for those countries in which a similar unit has been defined by law; in these countries the unit, so defined, is used.

Unit is contained in 0·0,455 mg of Standard Pr

3. Suggested Details of Method.

Preparation of a Solution of the Standard Prep.

A portion of the Standard Preparation is accurately weighed and dissolved in ~~water~~ saline solution acidified to pH 2·5, so that ~~1 Unit~~ 20 units is contained in ~~0·5~~ 1 millilitre. & antiseptic added to produce effect ·5% phenol. Stored in cold place, protected from freezing & months. [illegible] ~~A. FIRST PART OF THE TEST~~ dilutions a

RABBIT METHOD.

At ~~Ten or~~ twelve healthy rabbits, each weighing about ~~2000~~ grammes, are kept without food for about ~~twenty~~ 18 hours preceding the test. see [illegible] They are weighed, and divided into ~~two~~ groups, at random. ~~so that for each animal in one group there is one of approximately the same weight in the other group.~~ Samples of blood are withdrawn from the marginal ear vein of each rabbit, and the percentage of initial blood sugar is determined, as

Each rabbit of the first group then receives an injection of ~~0·5 Unit~~ of the Standard Preparation dilution containing 2 units per ml. ~~per 1000 grammes of body weight,~~ the injections being made under the skin. Each rabbit of the second group receives an injection of ~~0·25~~ 1 ml of a dilution of Standard Prep containing 1 unit per ml. ~~millilitre per 1000 grammes of body weight of a dilution of the sample being tested, so prepared that it may be expected~~

~~to contain 1 Unit in 0·5 millilitre~~. From each rabbit a sample of blood is withdrawn at the end of each hour for five hours after the injection, and the mean percentage of blood sugar in the five samples is determined for each rabbit. For each rabbit two numbers are now available, the original percentage of sugar in the blood and the mean percentage during five hours after injection calculated. The difference between the first and second numbers gives the average fall in the percentage of blood sugar, which is expressed as a percentage of the first number. This percentage is referred to hereafter as the 'percentage blood sugar reduction'.

B. SECOND PART OF THE TEST.

2 – 6 days

[illegible] The same animals are again prepared for test ~~three or four days~~ later + 18 hours fast. The same doses ~~per 1000 grammes of body weight~~ are used as in the first part of the test, but the rabbits which were injected on the first day with the dose of the Standard Preparation, now receive the dose of the sample being tested, while those which were injected with the sample being tested receive the dose of the Standard Preparation. The numbers for the percentage blood sugar reduction are then obtained as before. Any rabbit which convulses or shows abnormal symptoms is discarded before its response is calculated.

C. CALCULATION OF RESULT

The sum of the numbers for the percentage blood sugar reduction with the Standard Preparation is determined for the two days. Similarly the sum of the numbers for the percentage blood sugar reduction with the sample being tested is determined for the two days. The latter sum is divided by the former and the result multiplied by 100. This number represents the percentage activity of the sample being tested in terms of the solution of the Standard Preparation.

When the number representing the percentage activity of the sample being tested in terms of the solution of the Standard Preparation is not less than 90, and not more than 110, the test need not be repeated. The number of Units present in 0·5 millilitre of the dilution of the sample being tested is obtained by dividing this figure by 100.

When the number representing the percentage activity of the sample being tested in terms of the solution of the Standard Preparation is less than 90, or more than 110, the test is repeated, the dose of the sample being tested now being adjusted in the light of the result of the first or subsequent tests, so that the rabbits receive a dose expected to contain more nearly 0·5 Unit per 1000 grammes of body weight.

The number of Units so obtained may be assumed to have an accuracy equal to ± 10 per cent.

G. *BIOLOGICAL ASSAY OF OLD TUBERCULIN*

CAUTION.—In any part of the British Empire in which Old Tuberculin is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

The potency of a sample of old tuberculin is tested by comparing the dose of it, necessary to produce its specific toxicity in guinea-pigs or other animals infected with the *Bacillus tuberculosis,* with the dose of the Standard Preparation of Old Tuberculin, necessary to give the same effects. A sample of old tuberculin is considered to have passed the test only if no difference in its activity from that of the Standard Preparation is revealed.

1. Standard Preparation of Old Tuberculin.

The Standard Preparation for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925. The Standard Preparation is a quantity of Old Tuberculin kept in the National Institute for Medical Research, Hampstead, London. The Standard Preparation has the same activity as the international standard. The Standard Preparation for other parts of the British Empire is the same, except for those countries in which a similar standard preparation, kept in a different institute, has been defined by law; in these countries the standard preparation, so defined, is used.

2. Suggested Details of Method.

Guinea-pigs weighing from 300 to 400 grammes are infected by intramuscular injections of 0·00025 gramme to 0·0005 gramme of living bacilli from a three weeks' growth of *Bacillus tuberculosis.* Three weeks after the injection two of the guinea-pigs are tested to see if they have become sensitive, by making injections each of 0·2 millilitre of dilutions of the Standard

Preparation into the shaven or depilated skin. Suitable dilutions are 1 volume in 1000 volumes, 1 volume in 2000 volumes, and 1 volume in 4000 volumes of *physiological solution of sodium chloride.* The occurrence of inflammatory reactions at all the sites of injection indicates that the guinea-pigs are fully sensitive. If no reactions occur, two more guinea-pigs are tested after an interval of one week more.

When the guinea-pigs are fully sensitive, the test is carried out by making a series of injections of dilutions of the Standard Preparation into the skin of one shaven or depilated flank, and a series of injections of corresponding dilutions of the sample being tested into the skin of symmetrically situated points of the other similarly prepared flank, of a sensitive guinea-pig. Comparisons are made after twenty-four hours to determine whether the various dilutions of the sample being tested have caused reactions differing in size or in severity from those caused by the corresponding dilutions of the Standard Preparation. The test is repeated on several guinea-pigs, and the average effect is taken as the correct result. ~~A difference in potency of 40 per cent. can be detected by this test.~~ Limits of Error. 8 Guinea pigs used & 8 injectio re, properly randomised, the limits of error, calculated by tistical methods are such that in a average test, the true value is -127% value (P=0.95).

H. *BIOLOGICAL ASSAY OF PITUITARY* Injection *(POSTERIOR LOBE) EXTRACT*

CAUTION.—In any part of the British Empire in which Pituitary (Posterior Lobe) Extract is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

The activity of a sample of pituitary (posterior lobe) extract is determined by comparing its activity with that of the Standard Preparation of Pituitary (Posterior Lobe) Extract by a biological method based on an action on the muscle of the uterus, or by a method which has been shown to give results similar to those obtained by such a method. For this purpose an extract of the Standard Preparation, or of an equivalent laboratory standard preparation, must be prepared. Since the amount of the Standard Preparation, which will be supplied on request, is limited, each worker should prepare for use as a laboratory standard preparation a quantity of dry pituitary powder, the strength of which must be determined in relation to that of the Standard Preparation.

1. Standard Preparation of Pituitary (Posterior Lobe) Extract.

The Standard Preparation for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925. The Standard Preparation is a quantity of dried acetone-extracted substance, obtained from the posterior lobes of fresh pituitary bodies of oxen, and is kept in the National Institute for Medical Research, Hampstead, London. The Standard Preparation for other parts of the British Empire is the same, except for those countries in which a similar standard preparation, kept in a different institute, has been defined by law; in these countries the standard preparation, so defined, is used.

2. The Unit of Pituitary (Posterior Lobe) Extract.

The Unit for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925, and is the specific activity corresponding to that yielded by 0·5 milligram of the Standard Preparation, when extracted by the prescribed method. The Unit is the same as the international unit. The Unit for other parts of the British Empire is the same, except for those countries in which a similar unit has been defined by law; in these countries the unit, so defined, is used.

3. Method.

A. Preparation of Dry Pituitary (Posterior Lobe) Powder (Laboratory Standard Preparation).

Pituitary bodies are obtained from a number of cattle as soon as possible after slaughter. The pear-shaped posterior lobes are dissected free from other tissue, and dropped into a flask containing 4 millilitres of *acetone* for each posterior lobe. At the end of three hours they are cut up into small pieces, and placed in a similar amount of *acetone* until the next day. The material is then removed from the acetone, dried in an evacuated desiccator over *calcium chloride* for five hours, and ground in a mortar so as to pass through a *No. 44 sieve.* The resulting powder is again dried in an evacuated desiccator overnight, and extracted in a *continuous extraction* apparatus with *acetone* for three hours. It is once more dried overnight in an evacuated desiccator over *phosphorus pentoxide.* It may be stored in sealed ampoules, or in an evacuated desiccator over *phosphorus pentoxide.* Before use it must be assayed by several comparisons with a sample of the Standard Preparation.

B. EXTRACT OF STANDARD PREPARATION OR OF LABORATORY STANDARD PREPARATION.

From the stock of dry powder in the desiccator a small portion, corresponding to about 20 Units of the Standard Preparation, is transferred rapidly to a weighing bottle, and the bottle is at once closed. The powder is weighed. It is washed into a dry hard glass boiling-tube with one half as many millilitres of a mixture of 0·25 millilitre of *glacial acetic acid* and a sufficient quantity of *water* to produce 100 millilitres, as there are Units present in the quantity of powder taken. The top of the boiling-tube is plugged with cotton wool, and the tube is placed for five minutes in a briskly boiling water-bath. The tube is then quickly cooled, and the liquid is filtered through a dry filter paper into another hard glass tube. The filtrate is an extract of the Standard Preparation, or of the equivalent laboratory standard preparation, and contains 2 Units per millilitre. It is diluted ten times with the mixture of 0·25 millilitre of *glacial acetic acid* and a sufficient quantity of *water* to produce 100 millilitres. The diluted filtrate is distributed into a series of hard glass tubes, each of which is plugged with cotton wool, and sterilised by being placed in boiling water for three minutes. It is stored at 0°, and, provided the plug is not removed, remains unchanged in activity for not more than six months. [illegible].

C. SUGGESTED DETAILS OF METHOD OF COMPARISON.

Oxytocic Activity

Female guinea-pigs, as soon as they are weaned, should be separated from the males, and used for the test when they weigh between 170 and 270 grammes.

A guinea-pig is killed and one horn of the uterus is suspended in a bath containing a solution of the following composition :—

Sodium Chloride	9·0 grammes
Potassium Chloride	0·42 gramme
Calcium Chloride	0·24 gramme (calculated as anhydrous salt)
Sodium Bicarbonate	0·5 gramme
Dextrose	0·5 gramme
Magnesium Chloride	0·0025 gramme
Water (distilled and condensed in glass)	1000 millilitres

The bath is maintained at a temperature of 37°, and suitably oxygenated. The muscle is suspended in such a way that its contractions are recorded on the surface of a moving paper.

A suitable dose of a pituitary (posterior lobe) extract, usually from 0·05 to 0·1 Units for a bath of 100 millilitres, when added to the solution in the bath, causes a contraction of the muscle which increases with the dosage. When the contraction is complete, the liquid in the bath is replaced by fresh solution, and the muscle then relaxes. Repeated additions of pituitary extract may be made at regular intervals. By using doses which produce submaximal contractions, the strength of an unknown extract may be compared with that of the extract of the Standard Preparation.

The test should aim at making the following two determinations:—

(i) The greatest dose of the extract being tested which will produce a contraction smaller than that produced by a given dose of the extract of the Standard Preparation.

(ii) The least dose of the extract being tested which will produce a contraction greater than that produced by a given dose of the extract of the Standard Preparation.

Each of these two determinations should rest on the evidence of a series of not less than four contractions, produced by successive additions in the following order:—

x millilitres of the extract of the Standard Preparation.
y millilitres of the extract of the sample being tested.
y millilitres of the extract of the sample being tested.
x millilitres of the extract of the Standard Preparation.

The activity of an extract is expressed in Units per millilitre. The limit of error is ± 20 per cent. See Note Book.

PREPARED

I. *BIOLOGICAL ASSAY OF POWDERED DIGITALIS*

CAUTION.—In any part of the British Empire in which the biological assay of Powdered Digitalis is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

The activity of a sample of powdered digitalis is determined by comparing its activity with that of the Standard Preparation of Powdered Digitalis.

The method of comparison must be either one in which the activity is determined by the action on cardiac muscle, or one which has been shown to yield results similar to those obtained by a method based on this action. Among satisfactory methods are the method employing the frog, and the method employing the cat or the guinea-pig. Whatever method is used should be so applied that the standard deviation of the result, ascertained from a large number of determinations, is not greater than 10 per cent.

The method of preparing a solution, containing the active constituents of the Standard Preparation of Powdered Digitalis, must depend on the biological method selected, and the same procedure must be followed for the sample to be tested as for the Standard Preparation.

1. Standard Preparation of Powdered Digitalis.

The Standard Preparation for Great Britain and Northern Ireland is a mixture of dried and powdered digitalis leaves, kept in sealed vials in the National Institute for Medical Research, Hampstead, London. The Standard Preparation for other parts of the British Empire is the same, except for those countries in which a similar standard preparation, kept in a different institute, has been defined by law; in these countries the standard preparation, so defined, is used.

2. The Unit of Activity of Powdered Digitalis.

The Unit is the amount of activity contained in a stated weight of the Standard Preparation, this weight being declared by the authority responsible for issuing portions of the Standard Preparation. The Unit is the international unit, which is the amount of activity contained in 0·08 gramme of the international standard digitalis powder. The international standard digitalis powder is a quantity of dried and powdered digitalis leaves, which also is kept in the National Institute for Medical Research, Hampstead, London, on behalf of the Health Organisation of the League of Nations. Unit is contain 80 mg of the Standard prep at present use (1947)

3. Suggested Details of a Method employing the Frog.

A. PREPARATION OF THE SOLUTION FOR THE TEST.

A vial containing a portion of the Standard Preparation is broken, and the contents rapidly transferred to a stoppered weighing bottle, and weighed. The contents of the weighing bottle are transferred to the tube of a *continuous extraction* apparatus. About 25 millilitres of *dehydrated alcohol* per gramme of powder is put into the flask, and the extraction is begun. After extracting for six hours, the liquid is concentrated in the same flask to a volume of 5 millilitres per gramme of powder, transferred to a measuring cylinder, and made up to a volume with *water*, so that 10 millilitres of this extract represents 1·0 gramme of the Standard Preparation. A similar extract of the sample being tested must be prepared, which is also adjusted so that 10 millilitres of this extract represents 1·0 gramme of the sample being tested. Suitable dilutions of these extracts of the Standard Preparation and of the sample being tested are used in the test.

B. The Test.

The method of testing consists in making injections of suitable dilutions of the extracts of the Standard Preparation and of the sample being tested into similar groups of frogs. The dilutions are made with a 0·6 per cent. w/v aqueous solution of *sodium chloride*. The dose which each frog receives should be proportional to its body weight, determined to the nearest gramme, and may conveniently be expressed in millilitres per 100 grammes of frog.

The injections are made into the ventral lymph sac. The frogs are left until the following day, when the number of frogs in each group, which have died from the specific effect of digitalis on the heart, is determined.

The frogs used should be healthy, and preferably males; females should not be used when distended with eggs. The frogs in any one comparison should be either all males or all females. The weight of each of the frogs should be between 15 and 30 grammes. The frogs before being injected should be kept for at least two hours in a uniformly lighted part of the laboratory.

1. *Preliminary Test.* A preliminary test may be made, if necessary, to determine the doses of the extracts of the Standard Preparation and of the sample being tested, which are to be used in the Final Test. These doses must be great enough to kill some, but not all, of the frogs, the aim being to choose doses which will kill about one-half of the frogs in each batch. Usually such doses are about 0·5 millilitre of the extract per 100 grammes of frog.

2. *Final Test.* This test is performed in two parts, one part on one day, and the other part on the next day.

(*a*) *First Day's Comparison.*

Not less than 24 frogs are divided into two equal groups, so that, as far as possible, there is the same number of frogs of any given weight in each group.

Each frog in the first group receives an injection of the extract of the Standard Preparation, the same dose per 100 grammes of body weight being given to each. Each frog in the second group similarly receives an injection of the extract of the sample being tested, the same dose per 100 grammes of body weight being given to each, but not necessarily the same as that of the extract of the Standard Preparation, given to the first group. From the number of observed deaths in the two groups, expressed as percentage mortalities, the potency of the dose of the extract of the sample being tested, relative to the potency of the dose of the extract of the Standard Preparation, is ascertained by means of the following table :—

TABLE OF POTENCY CORRESPONDING TO A GIVEN PERCENTAGE MORTALITY OF THE FROGS

Mortality per cent.	Potency.	Mortality per cent.	Potency.
5	56	55	103
10	67	60	107
15	75	65	110
20	80	70	114
25	83·5	75	118
30	87	80	122
35	90	85	127
40	93·5	90	134
45	97	95	146
50	100		

Potencies corresponding to percentage mortalities, other than those given, may be obtained by interpolation.

The relation between the potencies of equal doses of the sample being tested and of the Standard Preparation is calculated, and the potency of the sample being tested is expressed in terms of the Standard Preparation, taken as unity.

(*b*) *Second Day's Comparison.*

The procedure on the first day is repeated, using a fresh

batch of not less than 24 frogs, the doses with which they are injected being adjusted, if necessary, according to the results in the first day's comparison, so as to produce an expected mortality of 50 per cent. in each group.

- From each comparison a figure is obtained for the potency of the sample being tested, and the average of these two figures is taken to indicate the true value. To state the potency of the sample being tested in Units per gramme, the figure for the average is divided by the weight in grammes of the Standard Preparation, which contains 1 Unit. To state the potency of the sample being tested in terms of the potency of the international standard digitalis powder, expressed as 100, the figure for the number of Units per gramme is multiplied by ~~10~~. 8

The use of a total of 48 frogs in the two comparisons gives a result of which ~~the standard deviation, ascertained from a large number of determinations, is 10 per cent.~~ er (P = 0·99) are 78 – 128 % provides that the slopes of [illegible] rel response does not differ significantly from that

4. Details to be observed in the Method employing the Cat or the Guinea-pig.

A. Preparation of the Solution for the Test. Fr

An extract of the Standard Preparation is prepared by a suitable method; an extract of the sample to be tested is prepared in the same way. When cats are used, the extract is prepared to contain the activity of 1 gramme in 200 millilitres of *physiological solution of sodium chloride*; when guinea-pigs are used, the extract is prepared to contain the activity of 1 gramme in 80 millilitres of *physiological solution of sodium chloride*. If ethyl alcohol is used, not more than 5 per cent. v/v must be present in the solution as administered.

B. The Test.

The extract of the Standard Preparation is injected at a slow uniform rate into the vein of a cat, or of a guinea-pig, which has been previously anæsthetised with a suitable anæsthetic, and in which the respiration is maintained artificially. The injection is continued, until the heart is arrested. The amount of extract, required to produce this effect, is taken as the lethal dose of the extract, and, by repeating the experiment in not less than 13 other animals of the same species, an average lethal dose is determined. The average lethal dose of the Standard Preparation need not be determined at each examination of a sample of powdered digitalis, but should be determined from time to time.

The extract of the sample being tested is examined in the same way, the average lethal dose being determined in not less than six animals of the same species as was used for examining the extract of the Standard Preparation.

The potency of the sample being tested, expressed in relation to that of the Standard Preparation, is determined by dividing the figure for the average lethal dose of the Standard Preparation by the figure for the average lethal dose of the sample being tested. The potency of the sample being tested is expressed in Units per gramme by dividing the figure, thus obtained, by the weight in grammes of the Standard Preparation, which contains 1 Unit. The potency of the sample being tested is expressed in relation to the international standard digitalis powder, taken as 100, by multiplying the figure for the number of units per gramme by ~~10~~.8·

The use of 14 animals for the Standard Preparation and of 6 animals for each sample being tested gives a result of which the standard deviation, ascertained from a large number of determinations, is ~~10 per cent.~~ (P = ·95) 76 – 126%

J. *BIOLOGICAL ASSAY OF TINCTURE OF DIGITALIS*

CAUTION.—In any part of the British Empire in which the biological assay of Tincture of Digitalis is controlled by law, care must be taken that the provisions of such law are duly complied with. (*See page 12.*)

The methods are the same as those used in the Biological Assay of Powdered Digitalis.

1. Standard Preparation for Use in the Assay of Tincture of Digitalis.

The Standard Preparation is the same as that for Powdered Digitalis.

2. Preparation of Solutions for the Test.

A tincture to be tested should be compared with a tincture prepared from the Standard Preparation, or, if preferred, with a freshly prepared extract of the Standard Preparation, made as described under the Biological Assay of Powdered Digitalis. When the method employing the frog is used, the tincture prepared from the Standard Preparation must not be more than six weeks old.

Limits of Error Same as for the biological Assay

K. *BIOLOGICAL ASSAY OF STROPHANTHIN* Del

CAUTION.—In any part of the British Empire in which the biological assay of Strophanthin is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

The methods are the same as those used in the Biological Assay of Powdered Digitalis.

1. Standard Preparation of Strophanthin.

The Standard Preparation for Great Britain and Northern Ireland is a standard strophanthin kept in the National Institute for Medical Research, Hampstead, London, the strength of which has been exactly determined in relation to the international standard ouabain by the frog method. The relation which the potency of samples to be tested must bear to that of the Standard Preparation, in order that the activity of such samples may be 40 per cent. of that of anhydrous ouabain, is declared by the authority responsible for issuing portions of the Standard Preparation. For other parts of the British Empire the Standard Preparation is the same, except for those countries in which a similar standard preparation, kept in a different institute, has been defined by law; in these countries the standard preparation, so defined, is used.

2. Details of Method.

The Standard Preparation may be issued as a solution in *dehydrated alcohol,* together with a statement of its strength at the time of issue, or as a dry powder. If obtained as a dry powder, a small portion of the Standard Preparation is accurately weighed, and a 0·1 per cent. w/v solution in *dehydrated alcohol* is prepared. This solution is stored in a bottle with a ground glass air-tight stopper, and is stable for at least one year. A solution of the sample being tested is similarly prepared. The dose of strophanthin for use in the frog method is about 0·1 milligram per 100 grammes of body weight.

L. *BIOLOGICAL ASSAY OF TINCTURE OF STROPHANTHUS*

CAUTION.—In any part of the British Empire in which the biological assay of Tincture of Strophanthus is controlled by law, care must be taken that the provisions of such law are duly complied with. (*See page 12.*)

The methods are the same as those used in the Biological Assay of Powdered Digitalis. given on page 615.

1. Standard Tincture of Strophanthus.

The Standard Preparation for Great Britain and Northern Ireland is a Tincture of Strophanthus, the strength of which has been accurately determined in relation to the international standard ouabain, and is kept in the National Institute for Medical Research, Hampstead, London. It is equivalent in activity to a 0·42 per cent. w/v solution of the international standard ouabain, or to a 0·33 per cent. w/v solution of anhydrous ouabain, when the comparison is made by the method employing the frog, as described under the Biological Assay of Powdered Digitalis. The Standard Preparation for other parts of the British Empire is the same, except for those countries in which a similar standard preparation, kept in a different institute, has been defined by law; in these countries the standard preparation, so defined, is used.

2. Details of Method.

The doses for injection are smaller than those used in the Biological Assay of Powdered Digitalis. As a rough guide to the doses which should be used, it may be assumed that Tincture of Strophanthus is about 45 times as active as Tincture of Digitalis.

Limits of Error are same as for the biological [illegible] [illegible]talis.

M. *BIOLOGICAL ASSAY OF NEOARSPHENAMINE*

CAUTION.—In any part of the British Empire in which the biological assay of Neoarsphenamine is controlled by law, care must be taken that the provisions of such law are duly complied with. (*See page 12.*)

Neoarsphenamine complies with the test for absence of undue toxicity, and with the test for therapeutic potency.

For ~~toxicity~~, it is tested in comparison with the Standard
Each test

or with its Equivalent approved by director of this Standard

Preparation on a suitable species of animal, by the injection of doses given intravenously. It passes the test, if its toxicity does not exceed that of the Standard Preparation by more than 20 per cent. and its therapeutic potency is not less than

For therapeutic potency, it is tested on a series of mice, or rats, infected with a suitable strain of pathogenic trypanosomes, such as *Trypanosoma equiperdum*. The mice, or rats, used for the test must be infected by the trypanosomes each to a similar degree, as determined by the number of the trypanosomes in unit volume of blood. The sample is tested by injecting different doses, each of which is administered to at least five of the animals; and the result is determined by comparison with the effect of injecting similar doses of the Standard Preparation into a similar number of animals of the same species having the same degree of infection. The sample being tested passes the test, if it has a curative action which is not less than that of the Standard Preparation.

1. Standard Preparation of Neoarsphenamine.

The Standard Preparation for Great Britain and Northern Ireland is that defined in the Regulations made under the Therapeutic Substances Act, 1925. The Standard Preparation is a quantity of Neoarsphenamine kept in the National Institute for Medical Research, Hampstead, London. The Standard Preparation for other parts of the British Empire is the same, except for those countries in which a similar standard preparation, kept in a different institute, has been defined by law; in these countries the standard preparation, so defined, is used. For purposes of this list an approved International Standard may be used.

2. Suggested Details of Method.

A. TESTS FOR ABSENCE OF UNDUE TOXICITY.

The absence of undue toxicity is determined by two tests, both of which must be passed.

(*a*) *Test on Mice.*

The following test on mice may be applied without simultaneous comparison with the Standard Preparation, provided that it has first been shown that the average lethal dose of the Standard Preparation is 7·2 milligrams per mouse, for mice weighing from 13 to 15 grammes. If the average lethal dose of the Standard Preparation differs from this amount, the quantity of the sample being tested, which is injected in the test, is modified accordingly, so that this quantity is precisely five-sixths of the weight of the average lethal dose of the Standard Preparation.

A 2 per cent. w/v solution of the sample being tested is prepared in freshly distilled *water*. This solution is given by intravenous injection to mice weighing not less than 13 grammes, and not more than 15 grammes, each mouse receiving 0·3 millilitre. Ten mice are first injected, and if not more than two die within three days, the sample being tested passes the test. If more than two mice die, a second series of ten mice receive similar injections. If the number of deaths in this second series within three days, when added to the number of deaths in the first series, is not greater than eight, the sample being tested passes the test. If, however, the number of deaths in the two series is greater than fifteen, the sample being tested fails to pass the test. If the number of deaths in the two series is greater than eight but less than fifteen, a third series of ten mice receive similar injections. If the number of mice which have died in the three series within three days is not greater than fifteen, the sample being tested passes the test; if the number is greater than fifteen, the sample being tested fails to pass the test.

(*b*) *Test on Rats.*

A 5 per cent. w/v solution of the sample being tested is prepared in freshly distilled *water*. This solution is given by intravenous injection to five rats, each weighing about 100 grammes, so that the dose received by each is 0·225 milligram per gramme of body weight. If not more than one of the rats dies within seven days, the sample being tested passes the test.

B. TEST FOR THERAPEUTIC POTENCY. See page 627.

(*a*) *Maintenance of Strain of Trypanosomes.* Line 5th.

The strain of trypanosomes may be preserved by infecting guinea-pigs, but in the test the trypanosomes are transmitted from ~~rat to rat, or~~ from rat to mouse.

(*b*) *Infection of Mice.*

A suspension of the blood of an infected rat is prepared in *physiological solution of sodium chloride* containing 1 per cent. w/v of *sodium citrate*, so that the suspension contains about 7000 trypanosomes per cubic millimetre. 0·25 0·5 millilitre of this suspension, well stirred, is injected into the peritoneal cavity of each of 20 mice. or more After forty-eight hours the blood of each mouse is examined microscopically, and those mice with a ~~moderate~~ infection are selected. The number of trypanosomes per cubic millimetre is counted in the blood of each of the selected mice. The number should lie between ~~100,000 and 500,000.~~ 1000 — 20000 per c.m.m. of blood.

For the sample being tested, 10 of these infected mice are used. Five mice receive 0·03 milligram per gramme of body weight, as a 0·2 per cent. w/v solution in freshly distilled *water*, and five mice receive 0·025 milligram per gramme of body weight, as a 0·2 per cent. w/v solution in freshly distilled *water*, the injections being made into a vein. Another 10 of the infected mice receive corresponding injections of the Standard Preparation. The blood of the mice is examined for trypanosomes on the day following the injection, and on each succeeding day for a week. Usually the mice receiving 0·03 milligram of the Standard Preparation per gramme of body weight are found to have no trypanosomes in the peripheral blood forty-eight hours after the injection, and those receiving 0·025 milligram per gramme of body weight are found to have no trypanosomes in the peripheral blood seventy-two hours after the injection. The sample being tested passes the test, if it has a curative action which is not less than that of the Standard Preparation.

N. *BIOLOGICAL ASSAY OF SULPHARSPHENAMINE*

CAUTION.—In any part of the British Empire in which the biological assay of Sulpharsphenamine is controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

The biological assay of Sulpharsphenamine is the same as that of Neoarsphenamine, with the following modifications:—

1. Wherever the word Neoarsphenamine appears, Sulpharsphenamine is read.

2. Under 'Tests for Absence of Undue Toxicity', the injections, which are given intravenously for Neoarsphenamine, are given subcutaneously for Sulpharsphenamine. ✓

3. Under 'Test on Mice', the volume injected into each mouse is 0·35 millilitres of a 2 per cent. w/v solution, given by subcutaneous injection.

4. Under 'Test on Rats', the strength of solution is 10 per cent. w/v, the injections are given subcutaneously, and the

dose received by each rat is 0·35 milligram per gramme of body weight. The sample passes the test, if none of the injections causes œdema or local necrosis.

5. Under 'Test for Therapeutic Potency', the doses of Sulpharsphenamine are given subcutaneously. The doses are 0·05 milligram per gramme, and 0·04 milligram per gramme, of body weight, both given as a 0·2 per cent. w/v solution, and a longer period of observation is allowed, seventy-two hours for the dose of 0·05 milligram per gramme of body weight, and ninety-six hours for the dose of 0·04 milligram per gramme of body weight.

APPENDIX XVI

SPECIAL PROCESSES USED IN PREPARING SOLUTIONS FOR INJECTION

A. *METHODS OF STERILISING SOLUTIONS FOR INJECTION*

1. Solutions of drugs to be administered by injection are dispensed in containers, which are sealed so as to exclude bacteria. When the container is sealed so as to permit the withdrawal of successive doses on different occasions, the solution of the drug contains a suitable antiseptic in such a concentration as will prevent the growth of bacteria at least as effectively as 0·5 per cent. w/v of *phenol.*

2. Sterilisation of Glass Vessels and Containers.

Glass vessels and containers are sterilised by heating to 150° for one hour, or by *heating in an autoclave.*

3. Heating in an Autoclave.

A solution to be sterilised by heating in an autoclave is distributed in the final containers, which are then sealed. When the volume in each container does not exceed 100 millilitres, the containers are exposed to steam at 115° to 116° for thirty minutes ; this temperature is reached, when the pressure at which the steam is applied is 10 lbs. per square inch in excess of atmospheric pressure. When the volume in each container exceeds 100 millilitres, the containers are exposed for a longer time, sufficient to ensure that the whole of the solution in each container is maintained at the temperature of 115° to 116° for thirty minutes.

4. Tyndallisation.

A solution to be sterilised by Tyndallisation is distributed in the final containers, which are then sealed and heated, so that the whole of the solution in each container is maintained at 80° for one hour on three successive days.

5. Filtration.

A solution to be sterilised by filtration is filtered through a sterile bacteria-proof filter. After the solution has been distributed into the final sterilised containers, and these have been sealed, the solution is submitted to the Tests for Sterility, and must comply with these tests.

6. Sterilisation of Oily Solutions.

A solution or suspension in oil is sterilised by heating to 150° for one hour; when the solution or suspension cannot be submitted to this temperature without the production of physical or chemical change, the solution or suspension is prepared by aseptic methods, and oil, which has previously been heated to 150° for one hour, is used. The solution or suspension is transferred to previously sterilised containers, and these are sealed so as to exclude bacteria.

7. Emergency Method of Sterilisation.

A solution required in an emergency is prepared by aseptic methods with the addition of an antiseptic in such concentration as will prevent the growth of bacteria at least as effectively as 0·5 per cent. w/v of *phenol*. The solution is distributed into previously sterilised containers, and these are sealed. The sealed containers are heated by immersion in water, or by other means, so as to maintain the temperature of the solution at 80° for not less than thirty minutes. The containers bear a label on which is written the date and the warning, 'Keep in a cool place, and use within four days.'

When this method is applied to a solution, intended for intravenous injection, the addition of an antiseptic is omitted; and the solution is prepared by aseptic methods, and then boiled for fifteen minutes.

This method is not applicable to solutions for intrathecal injection.

Note.—In any emergency in which the methods described above cannot be applied, it is the duty of the dispenser to inform the prescriber that complete sterilisation cannot be attempted, and to obtain the prescriber's approval for the method to be adopted.

B. *TESTS FOR STERILITY*

CAUTION.—In any part of the British Empire in which Tests for Sterility are controlled by law, care must be taken that the provisions of such law are duly complied with. (See page 12.)

1. Media to be Used.

Fluid media are used, the quantity of medium in each vessel being great enough to ensure that any phenolic antiseptic present in the sample is diluted to less than 0·01 per cent.

(*a*) In testing for aerobic organisms, the medium consists of meat extract, containing Suitable (concentration) 1 per cent. of peptone. After the final sterilisation, the *reaction* of the medium must lie between the limits represented by *p*H 7·2 and *p*H 7·8.

(*b*) In testing for anaerobic organisms, the medium is similar, with the addition of sufficient heat-coagulated muscle to occupy a depth of 1 centimetre at the bottom of the tube. After the final sterilisation, the *reaction* of the medium must lie between the limits represented by *p*H 7·2 and *p*H 7·8. Before the sample to be tested is added, the medium is heated at 100° for a sufficient time to free it from dissolved oxygen, and is then cooled to 37°, or lower. [illegible] a medium 0·5% Agar may be used with other substances or substances which reduce the oxidation-reduction potential & indicators [illegible] [illegible] added [illegible]

2. Method of Testing.

(*a*) Media for aerobic organisms and for anaerobic organisms are inoculated with the contents of each sealed container to be tested. When the volume in each container is 2 millilitres, or more, 1 millilitre is used for each test; when the volume is less than 2 millilitres, it is divided into two equal parts, one part being used for the aerobic test, and the other for the anaerobic test.

(*b*) The inoculated media are incubated at 37° for five days. If at the end of this time, a growth of micro-organisms is not seen in any tube, the sample passes the test. If a growth is seen, fresh samples may be taken and the test repeated, and, if necessary, this may be done a third time, If a growth is seen in each of the three tests, or if the same organism is seen in more than one test, the sample fails to pass the test.

C. *TESTS FOR LIMIT OF ALKALINITY OF GLASS*

The following tests apply to ampoules or similar glass containers, having a range of capacity from 0·5 millilitre to 25 millilitres.

1. Test to be Applied to Glass when Crushed.

(*a*) *Testing the Apparatus to be used.*

A test solution consisting of 100 millilitres of *water,* 0·4 millilitre of *N/100 hydrochloric acid,* and 0·4 millilitre of *strong solution of methyl red* is boiled, and, while boiling, transferred to a conical flask of resistant glass of 250 millilitres capacity. The flask is fitted with a reflux condenser, or with a suitable condensing apparatus, made of resistant glass. The flask is quickly placed in a bath of boiling water, so that the contained solution is below the level of the water in the bath. Boiling is continued for one hour. At the end of this time the colour of the solution is observed. If any change of colour has taken place, the flask and the condenser are unsuitable for use in the test.

(*b*) *Test of the Glass.*

The glass is crushed and sieved, the particles which pass through a *No. 25 sieve* but fail to pass through a *No. 36 sieve* being used for the test. 5 grammes of the sieved glass is washed free from dust in a small conical flask by repeated washings with *alcohol (95 per cent.),* and is dried at 100°. The sieved glass is placed with 100 millilitres of a fresh portion of the test solution into the conical flask, and the test is repeated, but the boiling is continued for half an hour instead of an hour. The glass passes the test, if at the end of this time the colour of the test solution has not changed from pink to the full yellow colour of methyl red, as indicated by comparing it with that of a solution prepared by adding 0·1 millilitre of *N/10 sodium hydroxide* to 10 millilitres of the test solution.

2. Test on Whole Ampoules.

Not less than six ampoules are used, and each ampoule must comply with the test.

Fill the ampoules to their prescribed capacity with *acid* *solution of methyl red*, seal by means of a blow-pipe, and heat in steam at a pressure of 15 lbs. per square inch for half an hour. Cool, and examine the colour of the solution. If necessary, when the ampoules are of coloured glass, the solution is removed for examination on to a thoroughly washed white glazed tile. The glass passes the test, if the colour of the test solution has not changed from pink to the full yellow colour of methyl red, as indicated by comparing it with that of a solution prepared by adding 0·1 millilitre of *N/10 sodium hydroxide* to 10 millilitres of the *acid solution of methyl red*.

NOTE.—Ampoules which have once passed the *test on whole ampoules*, may fail to do so after being stored. Whenever possible the test is carried out not more than fourteen days before the ampoules are to be used. If a batch of ampoules, which has passed the test but has been stored, does not subsequently pass the test, a sample of them may be resubmitted to the test after each ampoule has been washed internally with a 5 per cent. v/v aqueous solution of *glacial acetic acid*, followed by three washings with *water*. If the sample then passes the test, each ampoule of the batch is similarly washed before being used.

REAGENTS

Acid Solution of Methyl Red : mix 20 millilitres of *strong solution of methyl red* with 8·3 millilitres of *N/50 hydrochloric acid* and a sufficient quantity of *water* to produce 1000 millilitres.

Strong Solution of Methyl Red : dissolve 0·04 gramme of *methyl red* in 50 millilitres of *alcohol (95 per cent.)*, add 1·5 millilitres of *N/20 sodium hydroxide*, or a quantity sufficient to ensure that the colour of the solution corresponds to about *p*H 5·2, and dilute to 100 millilitres with *water*.

APPENDIX XVII

A. *TEST FOR FREEDOM FROM LIVING GAS-PRODUCING ANAEROBIC ORGANISMS*

Inoculate 0·1 millilitre of vaccine lymph into a suitable medium and incubate at 37° under anaerobic conditions; no gas is produced.

B. *TEST FOR FREEDOM FROM HAEMOLYTIC STREPTOCOCCI*

Thoroughly mix vaccine lymph with melted nutrient agar medium, and pour it on to a culture plate. Incubate at 37°, and examine daily for two days for the presence of colonies, having the appearance of colonies of streptococci. If any such colony is detected, examine it and determine the nature of the organism. If the colony is found to be formed of streptococci, isolate the organism, and test it for haemolytic properties by incubating it at 37° in nutrient broth to which fresh blood, or red blood corpuscles, has been added; no haemolysis is produced.

C. *TESTS FOR FREEDOM FROM ABNORMAL TOXICITY*

Both the following tests are applied:—

1. Inject 0·5 millilitre under the skin of a healthy mouse; neither serious symptoms, nor death, ensue.
2. Inject 5·0 millilitres under the skin or into the peritoneal cavity of a healthy guinea-pig; neither serious symptoms, nor death, ensue.

APPENDIX XVIII

POWDERS AND SIEVES

Powders. The degree of coarseness or fineness of a powder is differentiated and expressed by the size of the mesh of the sieve through which the powder is able to pass.

The following terms are used in the description of powders:—

Coarse Powder. (*10/44*). A powder of which all the particles pass through a *No. 10 sieve*, and not more than 40 per cent. through a *No. 44 sieve.*

Moderately Coarse Powder. (*22/60*). A powder of which all the particles pass through a *No. 22 sieve*, and not more than 40 per cent. through a *No. 60 sieve.*

Moderately Fine Powder. (*44/85*). A powder of which all the particles pass through a *No. 44 sieve*, and not more than 40 per cent. through a *No. 85 sieve.*

Fine Powder. (*85*). A powder of which all the particles pass through a *No. 85 sieve.*

Very Fine Powder.—A powder of which all the particles pass through a silk sieve in which not less than 120 meshes are included in a length of 2·54 centimetres (1 inch) in each transverse direction parallel to the threads.

When the fineness of a powder is described by means of a number, it is intended that all the particles of the powder shall pass through the sieve distinguished by that number.

When a batch of a vegetable drug is being ground and sifted, no portion of the drug shall be rejected; but it is permissible to withhold the final tailings, if an approximately equal amount of tailings from a preceding batch of the same drug has been added before grinding. The powdered drug must comply with the tests and microscopical characters of the unground drug.

Sieves. The wire sieves, used in sifting powdered drugs, are distinguished by numbers which indicate the number of meshes included in a length of 2·54 centimetres (1 inch) in each transverse direction parallel to the wires.

The sieves are made of wires of uniform circular cross-section, in accordance with the following specifications, which are in agreement with the British Standard Specification No. 410, 1931.

SIEVES

Number of Sieve.	Nominal Size of Aperture.		Nominal Diameter of Wire.		Standard Wire Gauge.	Approximate Screening Area.	Tolerance in Average Aperture.
	Inch.	Millimetre.	Inch.	Millimetre.		Per cent.	Per cent.
10	0·0660	1·676	0·034	0·864	20½	44	3
22	0·0275	0·698	0·018	0·457	26	36	5
25	0·0236	0·599	0·0164	0·417	27	35	5
30	0·0197	0·500	0·0136	0·345	29	35	5
36	0·0166	0·422	0·0112	0·284	31½	36	5
44	0·0139	0·353	0·0088	0·224	34½	38	5
60	0·0099	0·251	0·0068	0·173	37	35	6
85	0·0070	0·178	0·0048	0·122	40	35	6

APPENDIX XIX

ALTERNATIVE PREPARATIONS SANCTIONED FOR USE IN TROPICAL, SUBTROPICAL AND OTHER PARTS OF THE BRITISH EMPIRE.

Aurantii Cortex. In parts of the Empire where bitter oranges cannot be obtained, either dried bitter-orange peel or fresh sweet-orange peel may be used in preparing Tincture of Orange.

Emplastra. In tropical and subtropical parts of the Empire, varying quantities of Hard Soap, Colophony, or Yellow Beeswax, may be employed in the preparation of the Plasters of the Pharmacopœia, when prevailing high temperatures otherwise render the basis too soft for convenient use ; but the official proportion of the active ingredient must in all cases be maintained.

Extracta Liquida. In tropical and subtropical parts of the Empire any Liquid Extract, defined in the Pharmacopœia, containing less than 30 per cent. v/v of ethyl alcohol, may have the proportion of ethyl alcohol increased to an amount not exceeding 30 per cent. v/v of the Extract, where otherwise the preparation would be liable to ferment.

Limonis Cortex Siccatus. In tropical and subtropical parts of the Empire, when fresh Lemon Peel cannot be obtained, Dried Lemon Peel may be used in preparing Concentrated Compound Infusion of Gentian, Fresh Compound Infusion of Gentian, Syrup of Lemon, and Tincture of Lemon.

Oleum Olivæ. In parts of the Empire, other than the United Kingdom and the Irish Free State, where Olive Oil is not readily obtainable, Arachis Oil, or Sesame Oil, but no other oil or fat, may be employed in place of Olive Oil in making the official Liniments, Plasters, Ointments, and Soaps for which it is directed that Olive Oil be used.

Unguenta. In tropical and subtropical parts of the Empire varying quantities of Benzoinated Lard, Lard, Suet, Yellow Beeswax, or White Beeswax, may be employed in the preparation of the Ointments of the Pharmacopœia when prevailing high temperatures otherwise render the basis too soft for convenient use; but the official proportion of the active ingredient must in all cases be maintained.

APPENDIX XX

NAMES, SYMBOLS, AND ATOMIC WEIGHTS OF THE CHIEF ELEMENTS MENTIONED IN THE BRITISH PHARMACOPŒIA : O = 16.

Name.	Symbol.	Atomic Weight.
Aluminium	Al	26·97
Antimony	Sb	121·76
Arsenic	As	74·93
Barium	Ba	137·36
Bismuth	Bi	209·00
Boron	B	10·82
Bromine	Br	79·916
Calcium	Ca	40·08
Carbon	C	12·00
Chlorine	Cl	35·457
Chromium	Cr	52·01
Copper	Cu	63·57
Gold	Au	197·2
Hydrogen	H	1·0078
Iodine	I	126·932
Iron	Fe	55·84
Lead	Pb	207·22
Magnesium	Mg	24·32
Manganese	Mn	54·93
Mercury	Hg	200·61
Nitrogen	N	14·008
Oxygen	O	16·0000
Phosphorus	P	31·02
Platinum	Pt	195·23
Potassium	K	39·10
Silver	Ag	107·880
Sodium	Na	22·997
Sulphur	S	32·06
Tin	Sn	118·70
Titanium	Ti	47·90
Zinc	Zn	65·38

APPENDIX XXI

WEIGHTS AND MEASURES OF THE BRITISH PHARMACOPŒIA

With the legal contractions authorised under the Weights and Measures Act.

METRIC SYSTEM

MEASURES OF MASS (WEIGHTS)

1 Kilogram (kg. or kilog.) is the Standard or International Kilogram
1 Gramme (grm.) = the 1000th part of 1 kilogram
1 Milligram (mg.) = the 1000th part of 1 gramme

For the purpose of writing prescriptions, in order to avoid the possibility of confusion between 'gramme' and 'grain', the symbol 'G.' should be used as the contraction for 'gramme'.

MEASURES OF CAPACITY (VOLUMES)

1 Litre (lit.) is the volume occupied by the mass of 1 kilogram of water at the temperature of its maximum density.
1 Millilitre or Mil (mil.) = the 1000th part of 1 litre.

1 litre measures about 1000·028 cubic centimetres.

MEASURES OF LENGTH

1 Metre (m.) is the Standard or International Metre
1 Centimetre (cm.) = the 100th part of 1 metre
1 Millimetre (mm.) = the 1000th part of 1 metre
1 Micron (μ) = the 1000th part of 1 millimetre

IMPERIAL SYSTEM

MEASURES OF MASS (WEIGHTS)

1 Pound (Avoir.) (lb.) is the Standard Pound as defined in the Weights and Measures Act, 1878, Section 13.
1 Ounce (Avoir.) (oz.) = the 16th part of 1 pound = 437·5 grains
1 Grain (gr.) = the 7000th part of 1 pound

MEASURES OF CAPACITY (VOLUMES)

1 Pint (pt.) is the Imperial Standard Pint as defined in the Weights and Measures Act, 1878, Section 15.

1 Fluid Ounce (fl. oz.) = the 20th part of 1 pint = 8 fl. dr.

1 Fluid Drachm (fl. dr.) = the 8th part of 1 fluid ounce = 60 min.

1 Minim (min.) = the 60th part of 1 fluid drachm.

RELATION OF CAPACITY TO MASS (IMPERIAL)

1 Minim = the volume at 16·7° (62° F.) of 0·9114583 gr. of water

1 Fluid Drachm = the volume at 16·7° (62° F.) of 54·6875 gr. of water

1 Fluid Ounce = the volume at 16·7° (62° F.) of 1 oz. or 437·5 gr. of water

109·7143* Minims = the volume at 16·7° (62° F.) of 100 gr. of water.

* Taken as 110 minims throughout the Pharmacopœia.

RELATIONS OF METRIC AND IMPERIAL MEASURES

Mass

1 Kilogram (kg. or kilog.) = 15,432·3564 grains, or 35·274 ounces nearly, or 2·2046 pounds nearly

1 Gramme (grm.) = 15·4323564 grains

1 Milligram (mg.) = 0·015 grain nearly

---

1 Pound (Avoir.) (lb.) = 453·59 grammes nearly

1 Ounce (Avoir.) (oz.) = 28·350 grammes nearly

1 Grain (gr.) = 0·0648 gramme nearly

Capacity

1 Litre (lit.) = 1·75980 pints, or 35·196 fluid ounces nearly

1 Millilitre or Mil (mil.) = 16·9 minims nearly

1 Pint (pt.) = 568·2454 mils nearly, or 0·5682 litre nearly
1 Fluid Ounce (fl. oz.) = 28·4123 mils nearly
1 Fluid Drachm (fl. dr.) = 3·5515 mils nearly
1 Minim (min.) = 0·0592 mil nearly

Length

1 Metre (m.) = 39·370113 inches
1 Centimetre (cm.) = 0·39370 inch
1 Millimetre (mm.) = 0·039370 inch
1 Micron (μ) = 0·00003937 inch

---

1 Inch (in.) = 25·3999 millimetres

INDEX

The Index is arranged according to the alphabetical order of the English names of the official drugs and preparations. The Latin names of the official drugs and preparations, with the exception of Synonyms, are not included in the Index, because the text of the Pharmacopœia is arranged according to the alphabetical order of the Latin names.

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Synonyms appear with cross references.

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